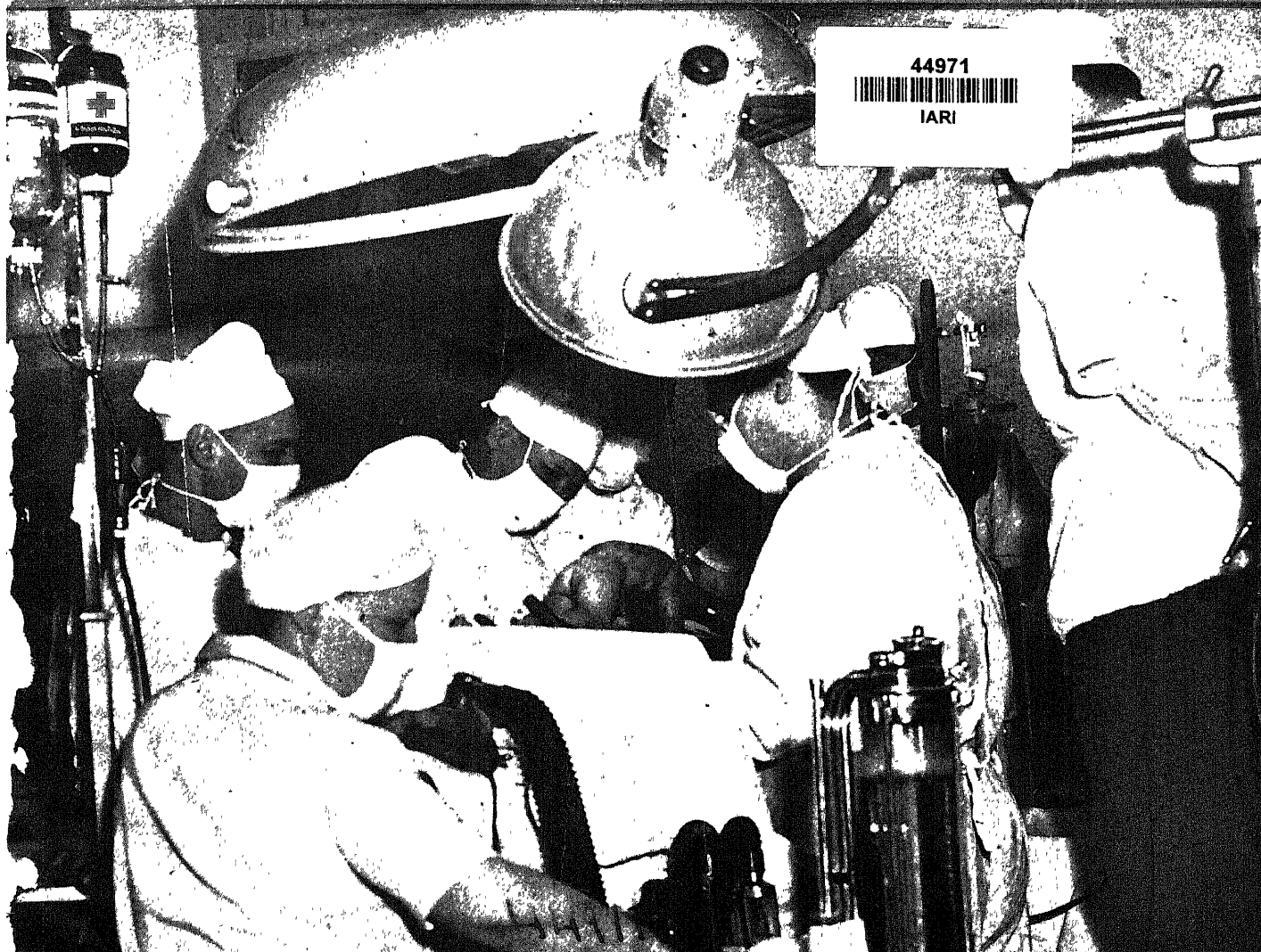


JULY 3, 1948

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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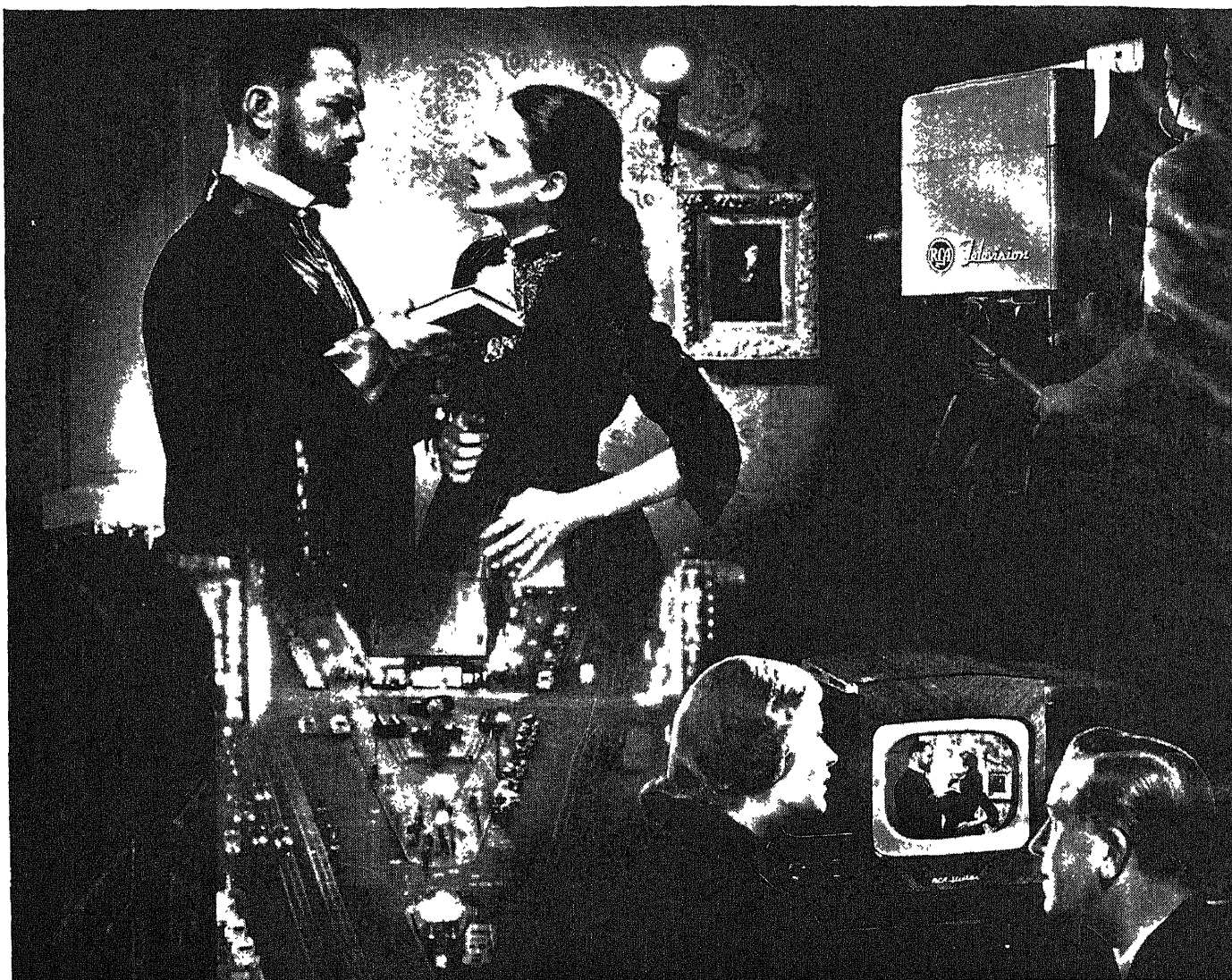
IARI

Blood Saves Mother

See Page 10

A SCIENCE SERVICE PUBLICATION

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Great drama comes to television in NBC telecasts of Theatre Guild presentations.

How wide is "Broadway"?

To all the world "Broadway" means the theatre. So when NBC, in October, 1947, introduced regular telecasts of Theatre Guild productions, an expansion of "Broadway" began—and some day it will be nation-wide.

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RADIO CORPORATION of AMERICA

MEDICINE

Avert Bleeding to Death

Blood transfusion under pressure into an artery and isolation of a powerful chemical from blood to counteract shock are developments which may aid future patients.

➤ MORE than 100 patients have been saved from bleeding to death on the operating table and others near death from injuries have been restored to life by giving them a second heart temporarily.

The method, together with announcement of isolation from blood of a chemical twice as powerful as adrenalin for fighting shock, were reported by Dr. Irvine H. Page of the Cleveland Clinic Foundation at the American Heart Association meeting in Chicago.

A dog that had stopped breathing for eight minutes, as well as other dogs apparently dead for shorter times, were restored to life by the second heart.

The second heart consists simply of a transfusion of blood under pressure into an artery. Blood transfusions ordinarily are given into a vein without pressure. When a patient has lost a large amount of blood or is in shock from other causes, his blood pressure is so low that the heart cannot pump blood into the body quickly enough, Dr. Page explained. Giving the blood transfusion directly into the artery under pressure primes the pump and starts it going again.

Patients who have stopped breathing will take a deep breath instantly when the blood starts going into their arteries under pressure. Plain tap water or water with salt in it can be used in emergencies if necessary, Dr. Page said.

The blood chemical that is twice as powerful as adrenalin was isolated in crystalline form with the aid of Drs. Maurice Rapport and Arda Green. It is called serotonin, "sero" for blood serum and "tonin" for its tonic effect. Its existence in the body has been known for years, but this is the first time crystals of it have been available.

There is not enough of it yet for use in treating patients. From two tons of blood, the Cleveland scientists got only about as much as a pinch of salt. They are trying now to learn its chemical structure in the hope of being able to make it synthetically.

Patients with coronary heart disease as well as those in shock might benefit if it could be obtained in large enough quantities for treatment. In heart disease its action is to prevent spread of the hemorrhage which caused the clot in the heart's artery.

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ELECTRONICS

Aerial Television Network

TELEVISION'S biggest evening, featuring the Republican convention, was brought to Zanesville, Ohio, a video-less community, with a promise of future air-borne television networks throughout the nation.

A plane flying lazy circles at an altitude of 25,000 feet over the Pittsburgh area rebroadcast the television shows of the big events in Philadelphia. This aerial network video is called "Stratovision" by the engineers of the Westinghouse Electric Corporation and the Glenn L. Martin Company who developed it.

Only eight planes would be needed for a coast-to-coast network between Hollywood and New York, they declared. Fourteen stratovision planes in

different locations could give television network facilities to more than half of the nation's area and 78% of the population.

Television and FM (frequency modulation) radio waves travel in a straight line, unlike standard broadcast radio waves. Because of this, television and FM usually do not go beyond the horizon, between 35 and 50 miles distant from the broadcasting equipment.

Costly relay stations or coaxial cable lines, which are not available now in most areas, are possible methods of carrying television network broadcasts. Stratovision broadcasts from planes are hailed as less expensive and more easily and rapidly put into operation.

A single plane can cover an area 500 miles across, equal in size to the states of New York, Pennsylvania and New Jersey. In stratovision, the plane simply becomes, in effect, an ultra-tall television antenna, many miles high.

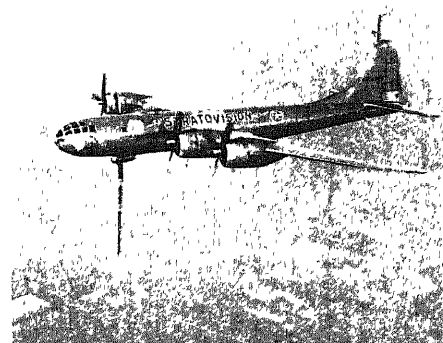
To link New York with Hollywood, eight stratovision planes strategically located would be used. Proposed spots for the planes include New York, Pittsburgh, Chicago, Kansas City, Curtis, Nebr.; Leadville, Colo.; Salt Lake City and Los Angeles.

Other planes, which might bring in the South, Southwest and Northwest would be flying over Durham, N. C., Atlanta, Memphis, Dallas, Sacramento and Portland, Ore., it has been suggested.

Work on stratovision began late in 1944 and was originated by a young Westinghouse engineer, C. E. Nobles, a 30-year-old Texan. The air-borne television network scheme has since been developed jointly by Westinghouse and Martin.

A modified B-29 plane was used in the demonstration, but future plans call for a special stratovision version of the Martin 2-0-2. The plane will need only 32 minutes to reach station altitude where it can stay for three hours, flying in a three-and-one-half-mile radius circle at 180 miles per hour. A four-man television crew would be needed.

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FLYING TELEVISION STATION
—This modified B-29 picks up programs from the ground station on the antenna projecting above the tail and re-broadcasts from the long mast-like antenna at the nose of the plane.

PSYCHOLOGY

Politician's Personality

Seekers of public office usually desire deference which they rationalize in terms of the public good. Personalities may tend toward reformer or administrator type.

➤ IT TAKES a special kind of personality to lead a man to seek nomination in the turmoil of clashing wills that marks a political convention such as that held in Philadelphia. And it takes a special kind of personality to be able to "sell" himself to the voters and be elected to the office of President.

This "Homo politicus" is described by Prof. Harold Lasswell, specialist on the psychology of politics at Yale University, in a new book, *"Power and Personality"* (Norton).

The "political man," says Prof. Lasswell, is a man with an intense and ungratified desire for deference. This he rationalizes in terms of public service or the public good.

A disproportionately large number of those holding public office come from professional families of the middle class. The parents in these families are likely to be always holding up and glorifying the ideal of public service rather than personal and purely private advantage, thus encouraging the boy to see his own desire for power and reward in terms of the public welfare instead of his own.

The politician's desire for power is sometimes born of alternate deprivation and indulgence when he is a child. This is characteristic, Prof. Lasswell points out, of the middle class family that holds children up to high ideals and niceties of conduct and is likely to discipline

them severely when they fail to reach these ideals. Sometimes, Prof. Lasswell says, the code is baffling.

"On the one hand he is supposed to 'be a nice boy' and not fight or engage in perversity, but on the other he is supposed to 'stand up for himself' in altercations with other boys."

Political and other ambition for power is fostered also, Prof. Lasswell says, by a home in which one member of the family, usually the mother, feels that she has married "beneath" her social class.

Political leaders are also likely to come from the country or small town. His abnormal desire to succeed and gain universal respect and deference is a way of compensating for the stigma of being a "hayseed."

Among the men battling for election to a single public office, you find a variety of personalities, Prof. Lasswell notes. One man may be an agitator or reformer; another basically an administrator. One may have a compulsive need for order and meticulousness in all his dealings; another tolerates diversity and is expansive.

Even the office of President may be changed by a new incumbent to fit his own personality.

"If he is an agitational type, he tends to respond to agitational opportunities," writes Prof. Lasswell. "If, on the con-

trary, he is an administrative type, he goes in the other direction. In either case the office changes, and the perspectives entertained about it are modified. Both Roosevelts developed the agitational possibilities of the presidential office, while Herbert Hoover underlined its administrative potentialities. A given trend may be reversed, as when William Howard Taft de-emphasized the impetus given to presidential leadership by Theodore Roosevelt, and Woodrow Wilson, in his turn, rejected the comparative inactivity of his predecessor and resumed the march toward expanding the office."

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MEDICINE

Heart Killer Stopped

By surgically creating an artery leading from the aorta, patients with coronary heart disease can get the much needed supply of blood blocked off by the disease.

➤ A SURGICAL operation to stop the great killer, coronary heart disease, was announced by Dr. Claude S. Beck, Western Reserve School of Medicine, Cleveland, at the meeting in Chicago of the Society for Vascular Surgery.

The coronary disease, in which the arteries supplying the heart muscle are blocked is the most common form of heart disease, the one that strikes men in the prime of life. Angina pectoris is one form of it. "Blue baby" and other heart conditions for which successful operations have recently been devised are less common.

Dr. Beck's operation consists in creating a new artery leading off the aorta, main artery of the body which carries blood from the heart to the smaller arteries which supply all parts of the body. It is the first time an artery has been created leading from the aorta.

The artery is made from a piece of vein grafted to it and is connected to a vein of the heart. The vein is used to

pipe in a new blood supply to the heart.

By turning a vein into an artery, surgeons can "give protection to the heart" which otherwise would die bit by bit from lack of blood to nourish it. With the new operation, it is possible to give the heart muscle even more blood than it needs, and Dr. Beck cautioned against giving too big a supply.

"There is a ceiling," he said, "to the amount of blood the heart muscle can take."

The operation so far has been performed on only one human patient, who died. He had a severe form of the disease. But the operation has been done on hundreds of dogs in the course of perfecting it.

"We are approaching the time when we may be able to do some good to these coronary heart disease patients by operation," Dr. Beck declared. He foresees many such operations being performed by himself and other surgeons.

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chance for survival were found to be shortness of breath, clouding of the senses and clammy sweating and hiccupping.

People who have had generalized hardening of the arteries or who have collapsed following an attack of heart failure, and those who have had diabetes, ulcers of the stomach or rheumatic fever have little likelihood, the doctors found, of return to useful life after a coronary attack.

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MEDICINE

Penicillin May Prevent Rheumatic Fever Attacks

➤ HOPE that rheumatic fever, greatcrippler of children's hearts, may in the future be prevented appeared in a report from Drs. Benedict F. Massell, James W. Dow and T. Duckett Jones of Boston, at the meeting of the American Medical Association in Chicago.

At the House of the Good Samaritan in Boston, they have been giving penicillin pills three times a day for ten days to little rheumatic fever patients who had streptococcus germs in their throats. In

MEDICINE

New Facts on Heart Ills

➤ TOBACCO, coffee and irregular or scanty meals apparently have no effect on the outlook for patients who have had heart attacks. At any rate, "it was impossible satisfactorily to determine any effect" in 240 patients, four physicians reported to the American Medical Association meeting in Chicago.

The physicians are Drs. F. Tremaine Billings, Jr., Bernard M. Kalstone, James L. Spencer and George R. Meneely of Nashville, Tenn.

In spite of the old impression that overweight persons are more prone to heart and blood-vessel disease, only one-third of the group studied were overweight. The immediate mortality, that is, deaths within 30 days after the heart attack, was slightly but not significantly lower among the heavyweights than among the normal-weight persons. The underweight persons had a slightly higher immediate mortality. Almost three-fourths of the overweights had high

blood pressure, which probably protected them from a fall in pressure after the heart attack.

Contrary to popular impression, farmers are almost twice as likely to die within 30 days after a heart attack than doctors, lawyers, and tradespeople. The explanation is that farmers and country people generally are only half as likely to be brought to a hospital within 24 hours after a heart attack. Patients brought to hospitals within 24 hours have a better chance of surviving than those brought in between 24 and 96 hours afterwards.

Right now and for the next two months is the season for fewest heart attacks. December, January and February, the cold months, are the time when heart attacks are most numerous and heart deaths most frequent. Immediate mortality is lowest, however, in March, April and May.

Ominous signs foreboding a poor



FIRE-FIGHTING SUIT—Made of aluminum foil laminated to a smooth cloth base, tests showed that the wearer could come within two feet of a 1500-degree fire with his body temperature rising only one degree. The suit reflected more than 99% of all heat rays. The helmet window is a one-way mirror reflecting rays directed at it from outside.

about three-fourths of the young patients, these dangerous germs were completely eradicated. In almost all, the germs were "suppressed" if not completely banished.

Similar doses of the mold chemical, the doctors believe, would prevent the strep germs from getting a foothold in the throats of the children and thus prevent rheumatic fever attacks. The prevention doses would be given when there was an outbreak of strep sore throats in the child's school or family or the community generally.

That this would help is shown by the experience at the Good Samaritan when hemolytic streptococcus infection broke out among the ward patients. Before the use of penicillin, about half the rheumatic fever patients would have had another attack of their disease in such a situation. But in this outbreak everyone was given penicillin. The out-

break was checked abruptly and none of the patients had recurrence of rheumatic fever.

Except for its present high cost, penicillin given by mouth is better than sulfa drugs for preventing rheumatic fever attacks, the Boston doctors believe. Their reasons are that the sulfa drugs are potentially toxic and are less effective against streptococci. Only a few of the children getting penicillin had any toxic reactions, and these were "serum-sickness like" reactions.

Penicillin resistance is not likely to develop with the doses used, the doctors believe.

Encouraging as the results seem, they state that more studies are needed before definite conclusions can be drawn. But they seem enthusiastic about the possibilities of preventing rheumatic fever by penicillin.

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ASTRONOMY

Poison Gas in Atmosphere

Methane has been detected in the light from the sun which passes through the atmosphere to the earth's surface by new all-reflecting infrared spectrometer.

➤ THERE'S lots of the poisonous gas methane in the earth's atmosphere. At least there is enough to register its presence upon light from the sun as it passes through our atmosphere on its way to the earth's surface.

A new system of molecular bands in the spectrum of the earth's atmosphere has been identified as belonging to methane, poisonous "marsh gas," by astronomers of the University of Michigan. These bands were reported at Pasadena, Calif., to the joint meeting of the American Astronomical Society and the Astronomical Society of the Pacific.

The new all-reflecting infrared spectrometer of the University's McMath-Hulbert Observatory was used for the study. This apparatus employs a Cushman lead-sulfide cell, a hundred times more sensitive than the best thermocouple previously used.

Dr. Robert R. McMath, Dr. Orren C. Mohler and Dr. Leo Goldberg stated that they now have completely mapped with this instrument the solar spectrum in the region 8,000 Angstroms, practically infrared and invisible to the naked eye, to 25,000 Angstroms.

The new solar map shows not only a wealth of solar atomic lines of such

elements as hydrogen, iron, magnesium, sodium, silicon, carbon, aluminum, calcium and others, but also numerous well-resolved molecular bands originating in the earth's atmosphere.

Most of these "telluric" band systems come from carbon dioxide and water vapor, as expected. The four new methane bands are at wavelengths 16,600, 22,000, 23,300 and 23,800 Angstroms.

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Star's Magnetic Field

➤ WE MAY some day learn more about distant stars—what they are and how they continue to exist—because of observations reported at the meeting for the first time by Dr. Horace W. Babcock of Mount Wilson Observatory of the Carnegie Institution of Washington.

Not just a star's temperature and surface gravity, but also its magnetic field, he stated, affect the star's spectrum. It is only by fanning out this starlight into its various parts that we learn which elements make up a distant star, estimate how hot its various layers of atmosphere are and so on.

Dr. Babcock proposed to the joint meeting that fluctuations of a star's mag-

netic field account for hitherto unexplained intensities of certain spectral lines in some white stars. Such changes are also responsible for variations in the spectra of these and other stars, he said.

In stars with high magnetic fields, spectral lines of certain elements may be very much broadened and intensified in appearance, Dr. Babcock found. This discovery complicates matters for astronomers, but adds further to our knowledge of the mechanism whereby stars operate.

Dr. Babcock gave as an example the lines of ionized europium in the star known as HD 125248, where these lines vary enormously in intensity with a regular period of 9.295 days. Corresponding to this, the known polar magnetic field of this star also varies. In synchronism with the changes in the europium line, it reaches a maximum of about 7,800 gauss, the strongest magnetic field known in nature.

At maximum the overall width of this star's europium line at wavelength 4205 Angstroms is about .35 Angstroms, compared to only about .023 Angstroms when there is no magnetic effect.

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MEDICINE

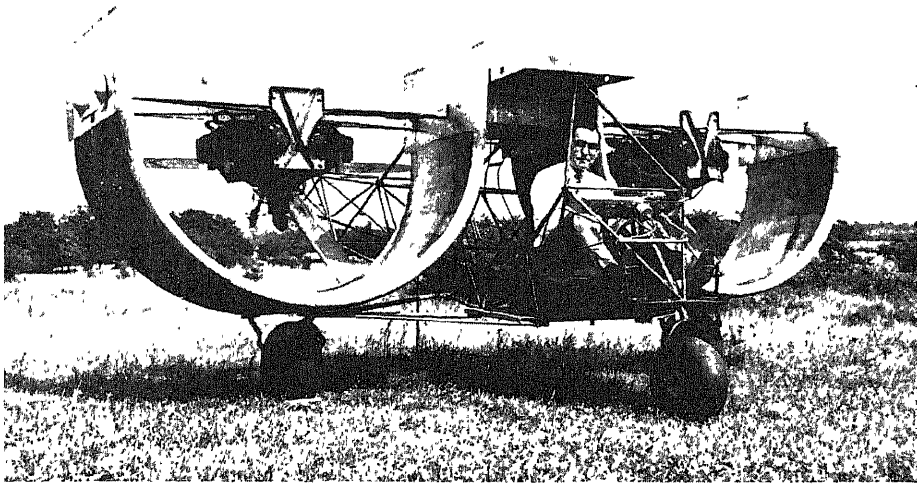
Fingernail Polish "Base" Damages Women's Nails

➤ A NEW medical mystery affecting women particularly was reported by Drs. James H. Mitchell, Douglas A. MacFayden and Bernard Jaffe, of the University of Illinois College of Medicine and Presbyterian Hospital in Chicago, to the American Medical Association.

Use of a "base coat" to make nail polish stay on longer has been causing strange damage to women's nails. The fingernails turn purplish blue, then white, and begin to separate from the fingers. As one physician facetiously put it, "The polish may stay on but the nails come off."

Whether the nails will recover and what causes the condition are unsolved mysteries. The Chicago doctors saw their first case in February this year. They have had reports of several hundred cases from doctors all over the country. The most widely sold brand of base coat has, naturally, caused the greatest number of cases. All brands probably are involved, since the trouble probably comes from a chemical ingredient used in all of them. So far, the ingredient has not been identified.

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HALF-CYLINDER WINGS—The advantage claimed for this radically new plane is easy take-off and landing. It has passed test flights successfully.

AERONAUTICS

New Channel Wing Plane

Although straight stubbed wing sections can be fitted across the half-cylinder wings, it will fly without them. Empty, the plane weighs less than 800 pounds.

➤ A RADICALLY new type of airplane will be ready for taxi tests soon. It is a plane without the customary straight wings but with what are called channel wings instead. These are downward-bowing half-sections of cylinders with engines at the center of the arcs driving pusher propellers at the rear.

Viewed from the front it resembles somewhat ordinary rimmed eyeglasses with the upper half cut away. The fuselage replaces the bridge of the nose, and a projection to the rear carries the tail. Fitted across the top there may be, or may not be, a stubbed wing section. It will fly without, the manufacturers claim. They also claim that the channel wings can be fitted under the wings of conventional planes to give greater lift.

The manufacturer of this new plane is the National Aircraft Corporation, organized in Hagerstown, Md., to develop the so-called Custer channel theory of flight. The name is taken from Wil-

lard R. Custer, who developed the wing. Test planes of the type have already made successful flights, it is reported. First flights were made with straight wings included. Later the plane was flown with channel wings only.

The half-cylinder wings on the new plane are six feet in diameter. The length of the cylindrical section is approximately three feet. The six-foot propellers, mounted to the rear of the cylinders, suck the air through them. Each of the two engines deliver 75-horsepower. The empty weight of the plane is less than 800 pounds. One particular advantage claimed is easy take-off and landing. It is said to be able to clear a 50-foot obstacle within a 50-foot take-off run, and to land almost in as little space as required for a routine helicopter landing.

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Normally, Europe plants about half the total world area growing potatoes.

PHYSIOLOGY

Eggs Started by One Hen, Finally Laid by Another

➤ EGGS that were started in the body of one hen have been transferred to another, fertilized, and finally laid and hatched. This difficult zoological feat has been accomplished by Marlow W. Olsen of the U. S. Department of Agriculture, with the technical assistance of B. H. Neher, at the great Beltsville, Md., research station.

A color motion picture made by Mr. Olsen to show the steps in the operation, was shown at the meeting of the Poultry Science Association in Ft. Collins, Colo.

To obtain the "unfinished" eggs for the experiment, the hen that produces them is killed. Unfertilized ova are removed from her ovary, each still covered with its sheathing membrane or follicle. Placed in individual covered glass dishes, the ova soon shed their follicles, looking very much like yellow grapes slipping out of their skins.

A hen that is to serve as the physiological foster-mother is put to sleep with an anesthetic. A surgical incision is made into her flank, to find the open upper end of her oviduct, or egg-laying tube. Into this the unfertilized ovum is placed, and started on its way. The incision is stitched shut, and the hen quickly recovers.

Fertilization of the transplanted ovum is accomplished by artificial insemination methods, and the egg is presently laid in the normal manner. It is placed with other eggs in an incubator and after the normal 21 days produces a healthy chick.

This technique is more than a scientific stunt; it is designed to help get answers to certain difficult physiological and genetic questions. Already it has settled one long-disputed point, by proving that fertilization takes place in the oviduct, not on the ovary as some zoologists have contended.

This was accomplished by using two different breeds of hens; when the chicks were hatched they had the down color of the actual mother, not of the foster-mother in whose body the eggs were fertilized and developed. Male parentage was made certain by the use of a rooster with a pea-comb; this reduced, "cauliflower-ear" type of comb is dominant in heredity over the more usual, blade-shaped comb.

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MEDICINE

Dime-Sized Area in Brain Is Consciousness Center

➤ A DIME-SIZED area in the very middle of the brain is the brain center for consciousness. Location of this area was announced by Drs. George N. Thompson and J. M. Nielsen of the University of Southern California, at the meeting of the American Medical Association in Chicago.

If this dime-sized piece of brain is destroyed, as by a blood clot, hemorrhage or tumor, the patient loses consciousness. He goes into a deep coma and while he may live on for several days or even three weeks, he does not recover.

Patients who sleep for prolonged periods, as in so-called sleeping sickness, or encephalitis, probably suffer damage to this seat of consciousness but not destruction of it, Dr. Thompson said.

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MEDICINE

Hormone, Vitamin Useful In Combatting Liver Ills

➤ USE of synthetic male sex hormone for treatment of chronic liver disease was announced by an eight-man research team of the University of California medical school and the U. S. Naval Hospital, Oakland, Calif., at the meeting in Chicago of the American Medical Association.

The treatment is aimed at helping patients with damaged livers build up body proteins from the meat and other protein foods they eat. In cirrhosis and other forms of liver damage the body may fail to build protein. Giving one of the protein building-blocks, an amino acid called methionine, helps some patients. But others are not helped even by this. In such cases, the Navy-California scientists advise trying doses of male hormone.

Scientists reporting this research are Drs. L. W. Kinsell, G. D. Michaels, H. A. Harper, Sheldon Margen, W. E. Larsen, A. V. Holmes, D. B. McCallie and E. F. Evans.

A vitamin test for early detection of liver disease was reported by Drs. Shepard Shapiro and Murray Weiner of New York and Dr. Paul Unger of Miami Beach, Fla.

Liver disease is definitely increasing in this country, Dr. Shapiro said. Many contracted jaundice while in military service, and a notable increase in alcoholism has also played an important part

in the rising rate of cirrhosis of the liver.

In their test for liver disease, they inject vitamin K, sometimes called the anti-bleeding vitamin, through the veins to the liver. If the liver is healthy, it uses the vitamin normally and completely as shown by its production of the blood-clotting substance, prothrombin. The diseased liver, however, utilizes the vitamin only partially and with considerable delay.

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BIOCHEMISTRY

Ammonia Preferred by Nitrogen-Fixing Bacteria

➤ AMMONIA is preferred to straight nitrogen from the air by the nitrogen-fixing bacteria that live in the root nodules of clover, beans and other leguminous plants. This has been discovered by Profs. Robert A. Burris and Perry W. Wilson of the University of Wisconsin, in experiments in which the rare stable isotope of nitrogen was used as a tracer element.

When offered both atmospheric nitrogen and nitrogen compounded into ammonia, the bacteria took the ammonia exclusively. When ammonia was introduced into the surrounding atmosphere the organisms switched to it within a minute.

Nitrogen taken in by the bacteria, whether from the air or in ammonia, became concentrated particularly in two of the amino acids, or protein building-blocks, known as glutamic and aspartic acids.

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BIOCHEMISTRY

New Growth-Promoting Chemical Announced

➤ A NEW growth-promoting chemical, that greatly speeded up the production of leaves by rice plants in experiments, was announced by a research group at the University of California. It also prolonged the life of grapevine cuttings. The new compound has been named dithiobiuret.

It seems to resemble other growth-promoting chemicals in having ill effects on plants when applied in too high a concentration. A strong solution caused tumor-like growths at the base of cuttings.

Members of the group who conducted the experiment were Pierre Carlo, Jean Dufrenoy, V. L. Pickering, Robertson Pratt, and Peter P. T. Sah.

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MEDICINE

X-Rays Relieve Pain In Arthritis of Spine

➤ PAIN and in some cases stiffness of the back in rheumatoid arthritis of the spine can be relieved for many sufferers by X-ray treatments. Whether the disease is arrested by the treatment is not yet known, though it has not gotten worse in a significant number treated from five to eight years ago.

Results of the treatment were reported by Dr. William D. Robinson of the University of Michigan at the meeting of the American Rheumatism Association in Chicago.

The reason the doctors are not sure whether the treatment has stopped the progress of the disease is that it may stop by itself without any treatment, and may in some cases remain quiet for long periods and then get worse. No specific cause for the condition is known.

Science News Letter, July 3, 1948

MEDICINE

Doctors Get Guide for Use in Atomic Attack

➤ A PRESCRIPTION guide for doctors to follow in case of an atomic bomb attack in their community or a neighboring one was presented by the Department of National Defense to the thousands of general practitioners of the nation at the meeting in Chicago of the American Medical Association.

Treatment of proven value for atomic casualties, national defense authorities state, consists of:

1. Normal nursing care.
2. Adequate diet high in protein (meat) and calories, low in residue, or bulk, and with added vitamins.
3. Fluids injected into the veins.
4. Whole blood.
5. Penicillin, sulfa drugs and the like.
6. Sedatives to help the victims sleep.

Treatment that may be of value but has not been proved consists of vitamins C and B₁, one of the adrenal gland hormones, and two chemicals which may help control bleeding. These two are rutin and the dye, toluidine blue.

Science News Letter, July 3, 1948

E FIELDS

AERONAUTICS

Propose Freedom of Entry For Private Planes

➤ **SIMPLIFIED** procedures for private planes to follow when crossing national boundaries received consideration at Geneva by the International Civil Aviation Organization of which the United States and 47 other countries are members. Entry without advance permits is proposed.

The procedure would apply to business as well as pleasure planes, provided that no remuneration is received for carrying either passengers or cargo. There is one important exception to the proposed freedom of entry without applying for permits in advance. This is when a flight is planned over inaccessible terrain or through regions without proper air navigation facilities. In such cases each state would be entitled to specify the route to be followed, or would require special permits.

It is proposed further, that if any state require a permit with respect to flights into its territory for traffic purposes, there should be no charge made for such permit. It is the desire of the recommending body that these proposals be included in appropriate international standards.

Science News Letter, July 3, 1948

ENGINEERING

Moisture Resistance Aids Proposed for Brick Walls

➤ **BRICK-MASONRY** building walls to withstand moisture penetration should have their tops covered, be constructed with high lime content mortars and be finished with concave mortar joints, the American Society for Testing Materials was told in Detroit by C. C. Connor, New Jersey Bell Telephone Company, Newark.

Bricks with moderately low water absorption properties should be used, and the mortar should have the property of retaining its water. The kind and type of the lime used in the mortar, the type and thickness of the walls, the back-up materials, the height of the buildings, and the molding process of the brick, he stated, exerted no significant

influence on moisture resistance.

The conclusions are based on a study of 91 brick-masonry buildings. The investigation was made because moisture penetration through walls above grade is one of the most serious problems in this type of construction. All buildings studied had been exposed to the weather for considerable periods.

Science News Letter, July 3, 1948

MEDICINE

Germ Warfare More to Be Feared than Atomic Bomb

➤ **GERM WARFARE** is more to be feared than atomic war, two experts on atomic energy declared at a special session of the American Medical Association in Chicago. They are Dr. Paul C. Aebersold of Oak Ridge, Tenn., and Dr. Joseph G. Hamilton of the University of California.

"I would be much more afraid of effective biological (germ) warfare than of atomic bombs, even with their combination of radiation and blast," Dr. Hamilton declared emphatically.

Atomic bombs, he and Dr. Aebersold stressed, are to be considered largely as high explosive and fire bombs. The radioactivity from them, even with underwater bursts, is secondary, the two agreed. And there is nothing mysterious about this radioactivity. It can be detected and measured. Monitors can tell where it is and what areas are therefore dangerous. With germ warfare, said Dr. Hamilton, who is also a physician, there are no equally good detection methods for spotting the hazards.

The scientists did not minimize the death and destruction atomic bombs can cause through blast and fire. But they said "it would take a lot of bombs" to require evacuation of New York, for example.

Seeking further to banish public fear of radioactivity from atomic bombs, the scientists said the dangers of sterility or of deformed offspring resulting have been exaggerated. By the time a man or woman absorbed the amount of radioactivity that could cause permanent sterility, the man or woman would be dead, or dying. The sterilizing amount absorbed from the environment is about the same as the lethal amount. Likewise the amount absorbed by the parents that might cause mutations in the way of deformed offspring would be enough to cause destruction of the infant before birth.

Science News Letter, July 3, 1948

PSYCHOLOGY

Theoretical Robot with Human Emotions Described

➤ **AN EMOTIONAL** robot which would register frustration and pleasure and would react to such human drives as heat, cold, and hunger was described to the meeting of the Western Psychological Association in San Francisco.

The robot so far exists only in theory as worked out by Dr. M. A. Wenger, psychologist of the University of California at Los Angeles. Dr. Wenger proposes rigging up an "autonomic nervous system," using two electric circuits. One circuit would be sensitive to heat, cold, circuit failure, and rust, indicating their presence by flashing a white light. The second circuit would be activated by the first one. It would indicate compensation mechanisms with a red light.

The two lights, red and white, appearing in the same reflector and blending into a pink color, would indicate "pleasure" or "well-being."

Other states in the robot might be indicated by the degree of redness or whiteness.

Science News Letter, July 3, 1948

HORTICULTURE

2, 4-D May Be Used To Speed Flower Production

➤ **2, 4-D, BEST KNOWN** as a weed-killer, may also be used, in much lower concentration, to speed up the production of flowers, experiments at Cornell University indicate. Using the chemical in one-thousandth the strength employed for weed-killing purposes, Dr. A. M. S. Pridham of the department of floriculture has stimulated early blooming in petunias, calendulas, marigolds and lupines. He has also tried it on one garden vegetable, red kidney bean.

This really represents a normal use for 2,4-D, since the entire class of chemicals to which it belongs were first known as stimulators of plant growth. Their killing effects are the result of deliberate overdosage applied to undesired plants.

Dr. Pridham states that much more experimental work needs to be done to learn how 2,4-D can be used on a practical scale as a growth regulator. He is on sabbatical leave at present, and plans to work in New Zealand on application of growth-regulating chemicals to crop production.

Science News Letter, July 3, 1948

MEDICINE

Blood Against Atom Bomb

One million pints of blood a week would be necessary in the event of atomic attack. This must be stockpiled now for emergency use and continually renewed.

By JANE STAFFORD

See Front Cover

➤ Rx: BLOOD, 1,000,000 pints. To be taken every week for first three weeks in event of atom bomb attack.

That prescription has already been written by the nation's leading authorities on medical defense.

There is only one blood bank in the world where that 1,000,000-pint-a-week prescription can be filled. That blood bank is circulating in the veins and arteries of the living American public.

But in the event of an atomic attack, there would not be time to find and bleed one million persons, test and process the blood, and transport it to the scene of the disaster. Some of the blood must be stockpiled, and the machinery for getting more in a hurry must be set up and ready to go into action at a moment's notice. And since blood cannot be kept longer than three weeks, the stockpile must be continually renewed.

National Blood Program

The answer to the problem, medical and health defense authorities believe, lies in the hands of the American Red Cross. During the war, this organization collected 13,326,242 pints of blood for our armed forces. Last year, when the nation's blood stockpile for ordinary peacetime needs was growing dangerously low, the Red Cross responded to widespread appeals to set up a national blood program. Now, with the world a-jitter over the possibility of atomic war, such a national blood program seems more essential than ever.

The reason why blood, millions of pints of it, would be needed in case of atomic attack was presented at a conference of clinical consultants to the national blood program by Dr. George M. Lyon, chief of the radioisotope section in the Veterans Administration. Before heading up this section of the VA, Dr. Lyon served as safety adviser to the U. S. Navy and Manhattan Engineering District. He was on hand for the first

atomic bomb test in New Mexico and later went to Bikini as safety adviser and senior representative of the Surgeon General, U. S. Navy.

"A study of the Hiroshima incident provides us with information relative to the unique aspects of atomic explosives," Dr. Lyon told the blood program consultants. "This has been further supplemented by information gained at Bikini."

At Hiroshima there were 80,000 deaths. Medical authorities estimate that 20,000 of these lives could have been saved if there had been available adequate facilities for providing medical relief.

Whole blood in sufficient amounts is the one most important medicine for preventing loss of life in this group, Dr. Lyon declared.

After an atomic attack, Dr. Lyon pointed out, there will be shock, burns from flash and flame, injuries from direct blast, flying debris and collapsing struc-

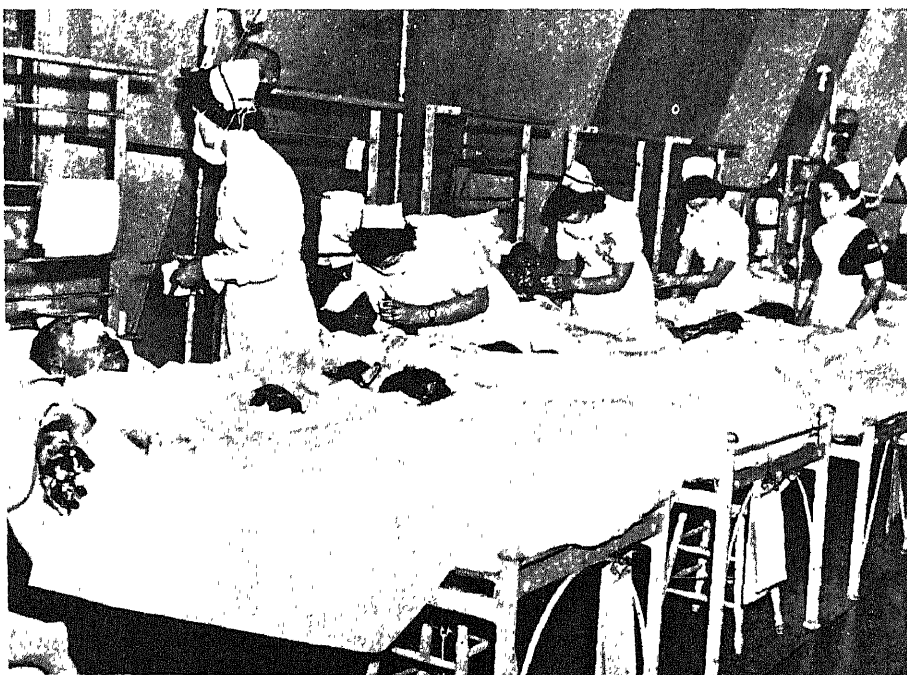
tures. On top of these injuries will be those due to the ionizing radiation from the bomb itself.

This ionizing radiation damages bone marrow and other blood-forming organs. The victims suffer a special kind of anemia in which they lack both red and white blood cells and hemoglobin. Hemoglobin is the chemical that gives blood its red color and, more important, carries oxygen to all parts of the body. The small blood vessels, called capillaries, grow fragile and leaky, so that blood may be lost through their walls. The membranes that line nose, throat, mouth, and other body openings are damaged and they are likely to bleed. Finally, because the normal clotting mechanism of the blood is damaged, the bleeding does not stop readily, as it does when a healthy person cuts his finger. Resistance to germ infection is also greatly reduced.

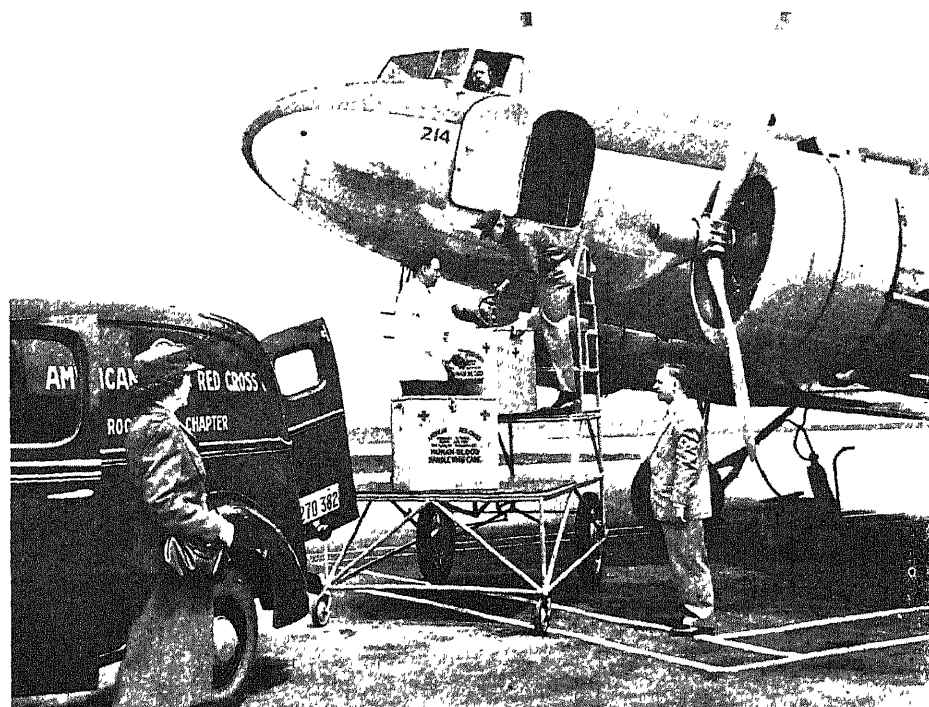
Whole Blood

"For patients presenting such a picture whole blood is particularly to be desired and other measures are particularly ineffective," Dr. Lyon declared.

Next in order for the victims of atomic



BLOOD NEEDS IN PEACE AND WAR—Atomic bomb survivors, like these night club fire victims, would need quantities of blood to help them recover from burns and radiation injury to their blood-forming organs.



EMERGENCY SHIPMENTS—Mercy flights bring blood to victims when disaster strikes in peace.

attack would be serum albumin, a material obtained from blood. This would be used for victims suffering severe burns from other than ionizing radiation.

Blood plasma would be valuable if stockpiles of serum albumin were not big enough to treat all the burn victims.

From the Hiroshima incident working figures for the amount of blood needed have been developed. If all the 80,000 fatal casualties there could have been treated, they would have needed one to three transfusions on the average. The requirements for all casualties, Dr. Lyon reported, would have been from 150,000 to 200,000 pints of whole blood or its equivalent in serum albumin.

Blood Needs

But military authorities state that plans must be made on the basis of at least 15 incidents equal to the Hiroshima one occurring within one week. And the need for whole blood will not be limited to the first few days but will continue for the first three weeks. Conservative estimates place the total amount of blood needed, therefore, at $15 \times 200,000$, or 3,000,000 pints. Fortunately this tremendous amount would not all be needed the first week. The requirements would be 1,000,000 the first week and similar amounts during the second and third weeks.

Plans for filling that 3,000,000-pint

prescription for blood are part of the National Blood Program. But that prescription is not the only reason for the National Blood Program. The daily peacetime medical needs of the nation call for 3,700,000 pints of blood per year. This is the blood needed to save the lives of accident victims, mothers in childbirth, as shown on the cover of this week's SCIENCE NEWS LETTER, patients undergoing surgical operations, others weakened and made anemic by serious illness.

Many cities have blood banks with enough blood to take care of ordinary peacetime needs. But these banks could not meet the needs of a national emergency or disaster. And many communities are without any blood banks. So are most of the rural areas of the nation.

The Red Cross National Blood Program is set up to fill these needs as rapidly as possible. Blood centers are being set up in cities. Bloodmobiles will operate from these centers to rural areas. You and I and all our fellow-Americans will go to the centers, if we live in cities, and meet the bloodmobile if we live in the country, to make our donations of blood, just as we did in the war.

Doctors and nurses will be in charge of the bleeding. The blood will be "processed" at the blood centers. That means it will be typed and tested and treated

with preservative and refrigerated under scrupulous scientific supervision. Some will be kept in the centers. Some will go back, via the bloodmobiles, to the small towns and rural hospital or health centers. Every 18 days, the whole blood will be called in and replaced by fresh blood. The old blood will be separated into plasma and red cells. Some of this will be stored for use in cases where plasma can be used as satisfactorily as whole blood. Surpluses will be divided into the various fractions which yield measles-stopping globulin, blood-clotting materials for surgical use and other substances which can help heal the sick.

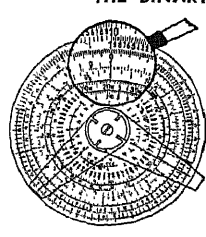
The blood and the various blood products will be free. Hospitals and physicians may charge a reasonable fee for giving the transfusion or one of the blood products, but there will be no charge for the blood or product itself.

Blood Centers

Setting up the blood centers, getting the equipment and organizing the staff of doctors, nurses and technicians all takes time. So there may not be a National Blood Program center in your community right now. And if your community already has one or more blood banks able to meet the needs, these banks will probably continue to operate while the Red Cross sets up a center in a region now without any blood banks. Or, as has already taken place in some regions, the local banks may decide to come into the National Blood Program and operate through it.

First of the regional centers of the National Blood Program was opened in Rochester, N. Y., in January of this year. Since then regional centers have been opened in Wichita, Kansas; Atlanta, Georgia; Tucson, Arizona; Washington, D. C., Los Angeles, San Jose and Stockton, California. In addition, the entire

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Do You Know?

Cowbirds lay their eggs in nests of other birds for hatching by them.

Among most *hoofed animals* the young are able to follow the parent within a few hours of birth.

What is commonly called the 17-year locust is actually the 17-year *cicada*, a close cousin of the dog-day cicada or harvest-fly.

World *population* has increased about 10% in the past decade.

A United States hatchery is shipping by plane about 1,000 baby *chicks* to Venezuela each week.

state of Massachusetts has come into the program.

But this is not just a program. It is not just a plan for meeting national disaster that may never come. It is vital action going on right now. Sick babies, old people, middle aged people in small towns are now being helped to health by gifts of blood from folks in other towns, large and small. Within three to five years, you and your neighbors, in cities or hamlets, will be giving and receiving blood for life and health.

First of three articles on blood.

Science News Letter, July 3, 1948

VETERINARY MEDICINE

New Disease Killing Dogs In U. S., Britain, Sweden

➤ DOGS in this country are suffering from a new and highly fatal disease, the American Veterinary Medical Association reported. Noticeable symptoms are fever, sore throat, coughing, loss of appetite, weakness and finally collapse and death. Sometimes there are also convulsions and other nervous manifestations. Postmortem examinations have shown severe damage to the liver.

Cause seems to be a virus, distinct from the virus that produces canine distemper. The disease seems to be identical with one that has killed 190 dogs in Sweden and "suggestively similar" to a malady that has caused the death of many dogs in Britain. Swedish veterinarians call it "hepatitis contagiosa canis."

Science News Letter, July 3, 1948

ANTHROPOLOGY

Geniuses' Lives Not Brief

Majority of acknowledged geniuses were not doomed to early deaths. In certain other traits, they conform to popular beliefs concerning them.

➤ GENIUSES don't die young, as a rule. Famous cases of brilliant lights snuffed out by early death, like those of Shelley, Keats, Schiller, Heine and Raphael, are exceptions, accounting for only one-half of one per cent of the world's acknowledged geniuses, declares Dr. R. E. G. Armattoe, director of the Lomeshie Research Centre for Anthropology and Race Biology in Londonderry, Ireland.

Offsetting the early deaths of these young geniuses are the long lives of many other noted men, he points out. Classic instances are Michelangelo, Da Vinci, Corneille, Goethe and Newton; among the great who have died more recently at advanced ages were H. G. Wells and Max Planck. Still living, full of years and honors, are Shaw, Sibelius and Einstein.

Geniuses share the widespread but erroneous belief that their lives will be brief, Dr. Armattoe found. Many of

them, convinced that they were doomed to die young, have labored with demonic energy, with the result that they produced their best work before 35.

Dr. Armattoe was induced to make his study by a naturalist friend of his, who wanted to know why geniuses are short-lived. Four years of investigation, into the lives of 12,000 generally acknowledged geniuses, convinced him that the assumption was false.

Modern men who rate high in the arts and sciences have a life expectancy of 65 years, which is far greater than the average for geniuses of past generations.

In certain other traits, however, Dr. Armattoe found geniuses to conform more closely to popular beliefs concerning them. Among these are a high degree of self-esteem, an infinite capacity for taking pains, and an indifference to the accepted code of sex morals.

Science News Letter, July 3, 1948

ASTRONOMY

Sun's Role in Cosmic Rays

➤ GIANT explosions associated with sunspots on the suns of the universe may be giving birth to the powerful cosmic rays which bombard our earth from outer space.

A natural atom-smasher, a kind of magnetic accelerator, is operating in the neighborhood of sunspots, Dr. Manuel Sandoval Vallarta of Mexico City suggested at a symposium on cosmic rays at the California Institute of Technology in Pasadena. Such an accelerator mechanism on our own sun may be producing a part of the cosmic radiation on the earth. Acceleration near sunspots on other stars might account for the rest of the cosmic rays, Dr. Vallarta pointed out.

This proposed solution for the mystery of the origin of the potent rays was presented to the National Academy of Sciences last year by Scott E. Forbush of the Carnegie Institution of Washington. He reported that Carnegie Institution records showed an increase in cosmic radiation at times of particularly high

activity on the sun. Dr. Vallarta has been working with Carnegie Institution scientists on a theory to explain how the suns of the universe could manufacture cosmic rays.

A new, yet-to-be-discovered cosmic ray particle was forecast at the symposium by a famous French scientist, Dr. Pierre Auger. Dr. Auger described the particle as a lightweight meson. It will have a weight of only three to ten times that of an electron, the tiny, negatively charged bit of atoms.

Known types of mesons, first found in cosmic rays and recently produced artificially for the first time at the University of California, have been assigned measured or estimated weights ranging from 200 to 900 times that of the electron.

The symposium, bringing together outstanding scientists from many countries, is being held in honor of 80-year old Dr. Robert Andrews Millikan, retired head of Cal Tech and a pioneer in the study of cosmic rays.

Science News Letter, July 3, 1948

TELEPHONY-MEDICINE

X-Ray Photos by Wire

Accident victims may owe their lives to this development if they are injured in a community where there is no radiologist to interpret their X-ray pictures.

➤ X-RAY PICTURES can now be sent by telephone. This new development, with life-saving implications for accident victims, was announced by Dr. J. Gershon-Cohen of Philadelphia and A. G. Cooley, New York engineer, at the meeting of the American Medical Association in Chicago.

A highway accident which took the life of a prominent industrialist during the war prompted the development of the telephoned X-ray technic. The accident victim was taken to a small hospital and X-ray pictures taken. But there was no one who could interpret the pictures. So the patient had to be transported several miles to a large city.

He died on the way. If there had been a radiologist at the small hospital the patient would have been saved. The radiologist could have told that the

injury would damage vital organs if not repaired before the patient was moved.

The X-ray telephone service is now operating routinely between the Chester Co., Pa., Hospital and Dr. Gershon-Cohen's office 50 miles away in Philadelphia. The hospital technician takes the picture, puts it on her transmitting machine and telephones Dr. Gershon-Cohen's office. He turns on his receiver, looks at the picture and tells the patient's physician, over the same telephone circuit, what he sees. The whole thing takes about three minutes.

As the facsimile transmission is similar to that used for transmitting newspaper pictures, it can operate between any two points on the continent. With radio instead of telephone it could serve ships at sea and patients around the world.

Science News Letter, July 3, 1948

they are uncertain. She is both real and encouraging to them. Thus, through her they are able to receive casual but important entertainment which helps them to preserve American family life as we know it, the study indicated.

Science News Letter, July 3, 1943

GENERAL SCIENCE

Scientists Should Examine Meaning of Their Work

➤ SCIENTISTS have the duty of examining the meaning and purposes of the work they are performing, particularly military research, a committee of the International Council of Scientific Unions declared in Paris.

The new "charter for scientists," written by the council's committee on social relations of science, states:

"When in the service of others, scientists have the duty to inquire into the purposes for which the work is being done and into the moral issues possibly involved."

The charter claims for scientists freedom of publication, economic security, and the right to participate freely in all activities permitted to all citizens. The committee warned all scientists of the danger threatening freedom of science through the increasing military influence on scientific research.

"Secrecy restrictions of military research," the committee said, "will lead to the abrogation of the traditional freedom of expression and publication and result in directed research, not planned primarily for the benefit of science and mankind, but rather for its destruction."

Science News Letter, July 3, 1948

PSYCHOLOGY

Soap Operas Beneficial

➤ SOAP OPERAS help to hold family life together. In this, they are like the old-time morality plays, in the belief of Drs. W. Lloyd Warner and William E. Henry of the Committee on Human Development of the University of Chicago.

By dramatizing the hopes and fears of the average American housewife, and her standards of right and wrong, the radio serial tells stories which point out good and evil in a way that ordinary people can understand, just as did the plays of the Middle Ages. People now, like those of many years ago, enjoy and benefit from this kind of drama.

The study was conducted in Chicago and Detroit among 60 housewives whose social position and education background were generally the same. Most of the women had graduated from high school; most of them lived in average residential neighborhoods and were the wives of clerical or skilled workers. All listen regularly to the daytime serials on the radio. The majority of them prefer the serials to any other type of radio program.

Extensive interviews with the women

were held, and a series of tests given, designed to show both their ways of thinking and feeling in general and their ideas and emotions about one of the popular serials, "Big Sister," a Columbia Broadcasting System program, sponsored by Procter & Gamble Co.

Contrary to the view of many people who think that such programs can only be a bore or a nuisance, it was discovered that Big Sister essentially gives the housewives a "lift." Their lives, it was found, are restricted, self-denying and unsatisfying. Demands are made of them which they are never sure they can meet, but which they consider their responsibility. Their general feeling is: I don't think I could do anything myself to handle my life better, but I wish I could do something.

When the housewives listen to Big Sister, who is happily married and who manages successfully troublesome friends and relatives, they are in the presence of a person much like themselves but a person who always can do something.

Big Sister meets problems they understand and solves problems about which

Nearly a million tiny *minnows* named *Gambusia affinis* are being planted in mosquito-breeding waters near Los Angeles this year; the fish clear the waters of mosquito eggs and larva.



Save-the-Redwoods

Send 10 cents each for these attractively illustrated pamphlets: "A Living Link in History," by John C. Merriam... "Trees, Shrubs and Flowers of the Redwood Region," by Willis L. Jepson... "The Story Told by a Fallen Redwood," by Emanuel Fritz... "Redwoods of the Past," by Ralph W. Chaney. All four pamphlets free to new members—send \$2 for annual membership (or \$10 for contributing membership).

SAVE-THE-REDWOODS LEAGUE
250 Administration Building,
University of California, Berkeley 4, Calif.

PHYSIOLOGY

Chilled Eggs Hatched

➤ CHICKEN and turkey eggs will hatch, and fertilized mammalian ova will develop into normal embryos, even if they are chilled to near-freezing temperatures for a time. This has been demonstrated in two series of experiments, one on chicken and turkey eggs conducted at the University of Maryland, the other on rabbit ova at the laboratories of the Worcester Foundation for Experimental Biology, Shrewsbury, Mass.

In the Maryland experiments, which were conducted by Prof. Morley A. Jull, Morley G. McCartney and Hussein M. El-Ibiary, eggs were held at temperatures ranging from 30.2 degrees to 53.6 degrees Fahrenheit for periods from 15 minutes to 16 hours. Most of the eggs were kept at the lower temperature, as measured by thermometers thrust into the centers of three eggs in each experimental group. Outside temperatures went as low as one degree below zero Fahrenheit.

After their chilling, the eggs were put into incubators, and careful records kept of the percentage of successful hatchings. Hatchability of eggs that were not chilled, used as controls, ranged between approximately 75% and 90%. Some of the chilled eggs, especially those that

were exposed to the cold for the shortest periods, scored practically as high. One lot, chilled at 30.2 degrees for four hours, beat the score of the best of the unchilled controls, with a hatch of 91.6%. Lowest score was turned in by the eggs that were chilled longest—only 17.9% of those kept at 30.2 degrees for 16 hours hatched.

In the Worcester Foundation experiments, carried out by Dr. Min-Chueh Chang, fertilized rabbit ova were removed from their mothers' bodies, chilled at freezing-point and at 50 degrees Fahrenheit for periods of from one to four days, then implanted into the bodies of other female rabbits and permitted to go through part of their embryonic development.

As with the chicken and turkey eggs, the longer the period of chilling the lower in general was the percentage of survival. However, even the ova that were kept cold longest were able in at least a small percentage of cases to continue development.

The Maryland experiments are reported in detail in the professional journal, *Poultry Science* (March); the Worcester research is described in a letter to the editor of the British journal, *Nature* (June 19).

Science News Letter, July 3, 1948

CHEMISTRY

Purification of Water

➤ A NEW method of purifying water and removing both acid and alkali chemicals in the same treatment was demonstrated at the laboratory of the Resinous Products and Chemical Co., Bridensburg, Pa.

Using synthetic resins, which swap harmless portions of another substance for the unwanted impurities in the water, the process is called "ion exchange." The new development consists of perfecting resins that will perform this exchange over the whole range of acidity and alkalinity.

Resins now in use will take out an acid-forming portion of a chemical and then another treatment using another resin is needed to remove the metallic side of the chemical impurity. For example, to get rid of calcium sulfate or carbonate (the stuff that makes the

bathtub ring in hard water areas), it was first necessary to remove the calcium by exchanging it for sodium or something else not objectionable and then to run the water through an exchanging tower in which another synthetic resin will bring about substitution for the acid-forming sulfate or carbonate portion.

Now the research chemists have succeeded in putting into the same tower or column a mixture of resins that do not interfere, with one of them handling anions (acid-formers) and another handling cations (metallic). Thus impurities that can be removed from water by ion exchange will be taken care of in a single passage through a single bed of exchange resins.

After use the resins, called Amberlites, can be separated, regenerated and then remixed for repeated use.

One of the new resins is an anion exchanger which will remove completely such weak acids as silicic, boric, carbonic, hydrosulfuric and carbolic.

The extension of ion exchange over the whole range, as the chemist terms the change in acidity and alkalinity, promises to open up hundreds of applications hitherto considered impractical.

A process called reverse de-ionization, which consists of the removal of anions before cations, has also been developed with the expectation that there will be important industrial applications.

Science News Letter, July 3, 1948

ANTHROPOLOGY

Expedition Wary of Tribe Of Reformed Cannibals

➤ "YUM-YUMS of Wow" is what the name sounds like. Might be a title for a show, with nice music and even nicer visual effects.

But spelled out correctly the name is Niam-Niams of Wau. Wau is in the southwestern Sudan, in eastern Africa, a long distance from either Broadway or Hollywood. The Niam-Niams are a very black but very hospitable tribe—whose hospitality nobody is particularly anxious to accept.

Members of the University of California African Expedition were in one of their towns lately but they didn't care to stay there over night.

The Niam-Niams of Wau, you see, used to be cannibals. They've reformed now (maybe). But they have an uncomfortable trick, when they meet a visitor, of gently feeling his arm and remarking how nice he'd be—in a pot. And nobody can be sure that they're really kidding.

The native cook attached to the expedition was given quarters in the Niam-Niam village while the rest of the party set up their tents a short distance away. At nightfall the cook reappeared, firmly declaring he wouldn't stay in that town after dark. He wanted no part of Niam-Niam cuisine—and still less did he want to become part of it.

The British district commissioner, Basil Duke, related how once, when he was hiring workmen for a job he needed to get done, he found one husky young man alone in a village, taking it easy. When the commissioner asked him why he wasn't on the job, the young Niam-Niam calmly replied, "Oh, you see, I'm taking some time off. I'm to be eaten next week!"

Science News Letter, July 3, 1948

Books of the Week

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HARVARD FOREST PAPERS, VOLUME I, No. 2: The Relation of Tree Development to the Timing of the First Thinning in Even-Aged Hardwood Stands—Torkel Holsoe—*Harvard Forest*, 7 p., paper, 25 cents.

HOW TO BE AN EXPERT CAR BUYER: A Special Report for Every Car Buyer and Car Owner—W. J. K. Cummings—*Cummings Enterprises*, 96 p., illus., paper, \$1.00. Information on what to look for, detection of mechanical defects, estimating costs, insurance and financing.

INDEX TO A.S.T.M. STANDARDS—*American Society for Testing Materials*, 240 p., paper, free upon request direct to American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.

THE INHIBITION OF MALARIAL RELAPSES BY TOXOID OF CLOSTRIDIUM TETANI—Eusebio Y. Garcia—*New York Academy of Sciences*, 16 p., illus., paper, 75 cents. Result of an accidental discovery that tetanus toxoid cured malaria.

INTER-AMERICAN CONFERENCE FOR THE MAINTENANCE OF CONTINENTAL PEACE AND SECURITY, QUITANDINHA, BRAZIL, August 15-September 2, 1947—Delegation of the United States of America—*Govt. Printing Office*, 225 p., paper, 40 cents. The appendices contain the final conference documents and

also background documents such as the Act of Chapultepec.

LOGARITHMS ARE EASY—J. Lucien Jones and James Bernard Jones—*Virginia Polytechnic Institute*, 26 p., paper, free upon request direct to the Virginia Polytechnic Institute, Blacksburg, Va.

MELLON INSTITUTE IN 1947-1948—*Mellon Institute of Industrial Research*, 6 p., illus., paper, free on request direct to the Mellon Institute, University of Pittsburgh, Pittsburgh, 13, Pa. Reprint from Chemical and Engineering News.

PROCEEDINGS OF THE FOREST PRODUCTS RESEARCH SOCIETY, VOLUME I—*Forest Products Research Society*, 340 p., \$6.00. Includes papers on the chemical utilization of wood and integrated logging, engineering aspects of wood use and on preservation and seasoning.

SOME UNSOLVED PROBLEMS IN THE CHEMISTRY OF THE NUCLEIC ACIDS—R. Stuart Tipson—*Mellon Institute*, 7 p., paper, free upon request direct to the Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa. Reprinted from the Journal of the American Pharmaceutical Association.

UNITED STATES ARMY IN WORLD WAR II, THE ARMY GROUND FORCES: The Procurement and Training of Ground Combat Troops—Robert R. Palmer, Bell I. Wiley and William R. Keast of the Historical Section, Army Ground Forces—*Govt. Printing Office*, 696 p., \$4.50. Reveals details, undisclosed during the war, of the Army Specialized Training Program, the sudden ending of the ASTP and other matters of special interest to scientists and educators.

THE VERTEBRATE FAUNA OF THE SELMA FORMATION OF ALABAMA: PART I, INTRODUCTION; PART II, THE PLEURODIRAN TURTLES—Rainer Zangerl—*Chicago Natural History Museum*, 54 p., illus., paper, \$1.50.

YOUR SKIN AND ITS CARE—Howard T. Behrman and Oscar L. Levin—*Emerson*, 255 p., illus., \$2.50. Intended for the ordinary person who must make the most of his own face.

Science News Letter, July 3, 1948

TELEPHONY

Frequency Bands Proposed For Radiotelephony

➤ INCREASING use of telephones in motor vehicles for communication to offices and homes through radiotelephony has resulted in proposals by the Federal Communications Commission to supplant present service with three new classes of mobile service on a regular basis and establish radio frequency bands for each.

The proposed three classes are:

1. Land Transportation Radio service for intercity buses and trucks, urban transit vehicles, railroads and taxicabs.

2. Domestic Public Mobile Radiotelephone service, a common carrier service to the general public.

3. Industrial Radio service for delivery and pickup trucks, auto clubs, doctors' cars and ambulances.

The frequency bands proposed for each classification are now available in a release of the Federal Communications Commission, and may be obtained from its office in Washington. The proposed new services consolidate a number of radio services, reduce the overlap between them, and increase the number of businesses eligible to use radio media.

While certain uses of radio warrant the establishment of independent services, the federal office states, others fall readily into general classifications and need only to be subdivided by types of stations. For example, the power, petroleum, and logging groups have demonstrated a need for communications on a national basis, while others require only a local type of operation.

Science News Letter, July 3, 1948

GEOLOGY

Volcanoes Roared in India 250 Million Years Ago

➤ EVIDENCE that volcanoes roared in northwestern India a quarter of a billion years ago has been found by S. R. N. Rao, University of Lucknow geologist. In a formation of slate near Srinagar, Kashmir, he discovered the split half of a volcanic bomb, which is a hollow mass of lava of a type often thrown out by volcanoes.

In the same slate were fossils indicating that it had been formed during the geologic period following the Coal Age, some 250 million years ago.

The discovery has been reported to the British journal, *Nature* (June 5), by Prof. R. C. Misra of the University.

Science News Letter, July 3, 1948

HOUSES OF EARTH

The ground you stand on is your best building material. Easy to build—insulated against heat and cold. Ratproof—Soundproof—Termiteproof and Fireproof. Book based largely on findings of the Bureau of Plant Industry, Soils and Agricultural Engineering. Low Building and Upkeep costs.

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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington, 6, D. C. and ask for Gadget Bulletin 421. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **VENTILATED SHOE**, recently patented, makes use of a flexible lift on the heel whose movements, when the wearer is walking, forces air through an opening into the shoe under the person's heel. Air is drawn into a cavity in the heel through a valve-controlled intake.

Science News Letter, July 3, 1948

⚙️ **PRESSURE TANK** holds sufficient compressed air for home paint spraying equipment and other uses, and can usually be refilled free at any gasoline station. The 7- by 14-inch tank has a convenient folding carrying handle, and supports to hold it in a horizontal position.

Science News Letter, July 3, 1948

⚙️ **NIGHT LIGHT**, a one-watt baby fluorescent lamp, gives a soft white glow that illuminates a child's room without awakening the lightest sleeper. It has a two-prong base for plugging into a baseboard or wall outlet, and its cost of operating is claimed to be less than three cents a month.

Science News Letter, July 3, 1948



⚙️ **BABY COVER**, which also protects the carriage, makes it easy to take the youngster out for air in the rain. As shown in the picture, this well-tailored, transparent, plastic poncho, which zippers up the back, is fitted to keep everything dry.

Science News Letter, July 3, 1948

⚙️ **COFFEE MAKER**, an automatic electric French drip type, has its heating unit between the lower section, which may be used as a server, and the upper section into which cold water is put. It is made of heavy aluminum and contains no glass. The coffee is brewed at about 180 degrees Fahrenheit.

Science News Letter, July 3, 1948

⚙️ **WHEELED SPRAYER**, for applying liquid weed-killers, insecticides or fungicides to extensive lawns, has a seven-gallon tank, valveless circulating type pump, 10-inch rubber-tired wheels and a pushing handle easy to grip. Nozzles, placed low on the front of the tank are adjustable and deliver a flat fan spray.

Science News Letter, July 3, 1948

⚙️ **SOAP-HOLDING BRUSH**, with strap extensions to enable it to be used for scrubbing the back while in the shower or tub, has a meshed basket to hold the soap, and also a sponge. Loops on the ends of the straps of this recently patented device provide easy gripping.

Science News Letter, July 3, 1948

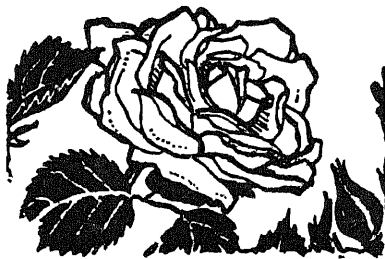
Nature Ramblings by Frank Thone

BOTANY

"Calling Names"

➤ "THOSE AWFUL long Latin names" are often offered as an explanation of reluctance to study botany or zoology. Yet the same person who gives this excuse will without hesitation order chrysanthemums, cinerarias or geraniums from the florist, or go out into the garden to plant nasturtiums, delphiniums and campanulas, or to prune philadelphus, forsythia and rhododendron bushes in the shrubbery. We manage all right with the long names we know; the unfamiliarity of new names, rather than their length, would seem to be the real stumbling-block.

Many of the botanical names that have been taken over "as is" into our common garden English are short even if Latin—or, more frequently, latinized Greek. Among them *iris*, *phlox*, *dahlia*,



azalea, *salvia*, *yucca*, *trillium*, *cosmos*, *geum*, *smilax*, *clematis*, *silene*, *lychnis*, and dozens of others.

Many of other botanical names were the common names by which the ancients knew the same plants, were adopted as scientific names by early modern botanists, and have come over into English slightly modified—frequently by passage through French or Italian. Thus *Rosa* was turned into rose, *Viola* into violet, *Pisum* into pea, *Pinus* into pine,

Ulmus into elm, *Papaver* into poppy. *Mentha* into mint, and so on. A most interesting sequence is from Greek *Lirion* into Latin *Lilium*, thence into English lily.

Some botanical names are actually shorter than their English opposites. It takes less time to say *Nymphaea* than it does to say water-lily, *Convallaria* than lily-of-the-valley, *Smilacina* than false Solomon's seal, *Specularia* than Venus' looking-glass.

A few of the longer plant names have been cut down to monosyllables by florists, for convenience in reference and display advertising, like "mums" for chrysanthemums and "glads" for gladioli. The surprising thing is that there are so few such trade terms. You never hear geraniums called "yums", or centaureas referred to as "cents", or aspidistras shortened to "asps".

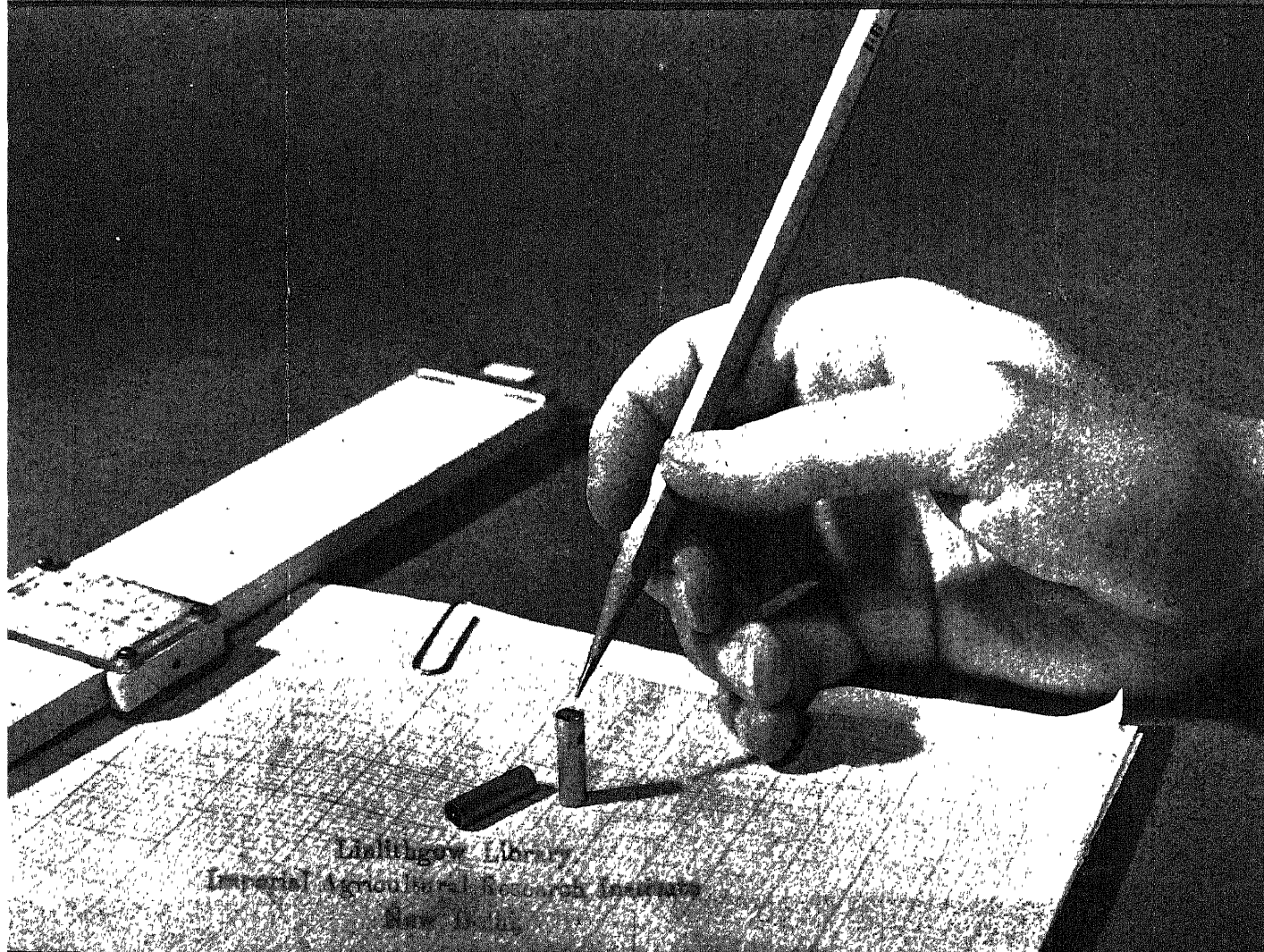
Science News Letter, July 3, 1948

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JULY 10, 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Liaoning Library
Imperial Agricultural Research Institute
New Delhi

New Electronic Amplifier

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VOL. 54 NO. 2

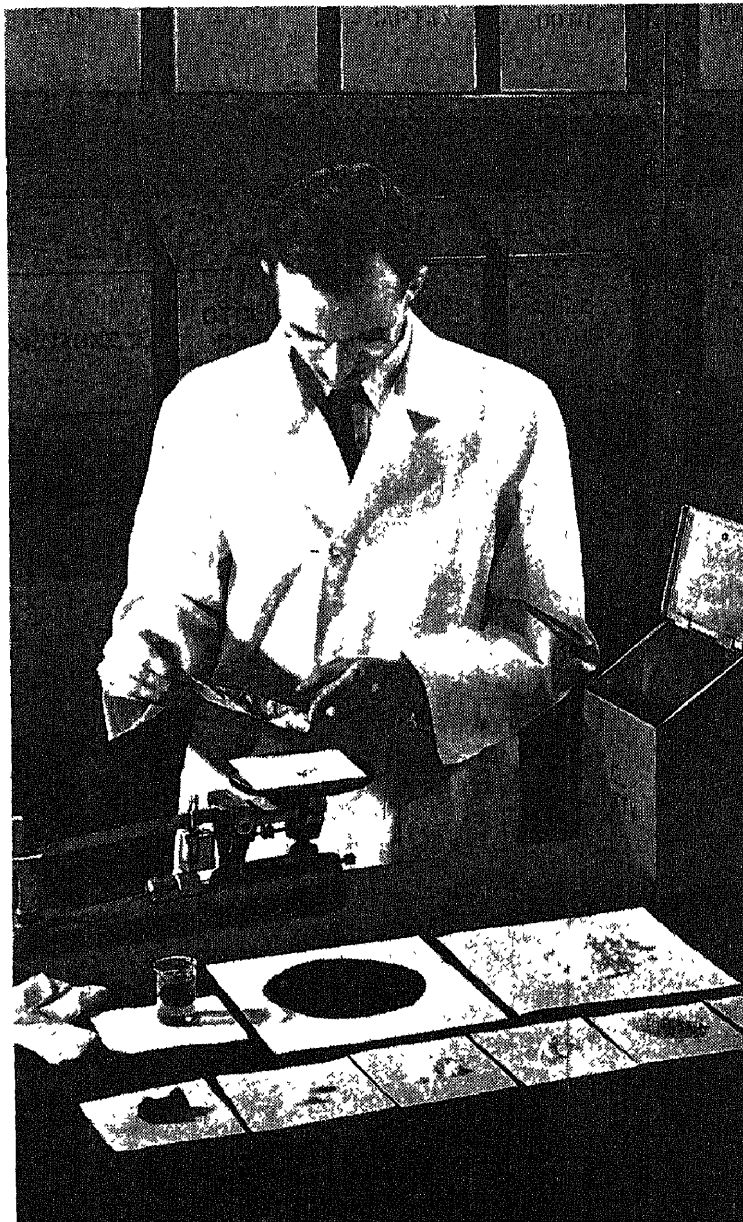
RUBBER RECIPE

Rubber compounds to the tune of some 35 million pounds a year go into the Bell System plant. Each compound must meet many requirements for resistance to humidity, oxygen, ozone, light and abrasion. The right properties depend on skillful selection and compounding of ingredients; this is one of the jobs of Bell Laboratories.

Sulphur, one essential ingredient of rubber, can also be corrosive. That seemed to rule out rubber on telephone cords. But Bell chemists found that if they held sulphur to the bare minimum, corrosion ceased. Now your handset cord has long life, is less susceptible to moisture as, for example, from a wet umbrella.

Connecting your home to the telephone wire on the street is a "drop"—one hundred feet or more of rubber-insulated wire. Once this wire was protected from ozone, light and abrasion by an impregnated cotton braid; but water leached the impregnant, and the braid rotted. Bell chemists tested scores of synthetics, and selected neoprene as an exterior covering with many times the life of braid.

Rubber is only one of many types of insulation developed by the Laboratories for the Bell System; insulation is only one of the Laboratories' problems in providing a quick, economical path for your voice.



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ELECTRONICS

Vacuum Tube Has Rival

New transistor, made of semi-conducting germanium metal, may result in more stable and durable radios, television sets and electronic devices.

See Front Cover

► THE glass vacuum tube in your radio has its first rival in 40 years—a bit of semi-conducting germanium metal that amplifies or oscillates current without the complexity of plates and wires in an airless bulb.

This new transistor, as it has been christened, should allow more stable and durable radios, television sets and electronic devices. Radios may be made smaller, when the new cylinder, slimmer than a pencil and less than an inch long, as shown on the cover of this week's SCIENCE NEWS LETTER, comes out of the development laboratories into production.

Because the new device has no filament that must heat up before it operates, it goes into action instantly. It will do some electronic tricks that conventional vacuum tubes can't do. This means new electronic devices.

Invented at Bell Telephone Laboratories in New York, the transistor's operation is possible because the ability of a semi-conductor to carry electrical current can be controlled. This is done by changing the

electronic structure of a small bit of material under the influence of the incoming current, fed to it through a fine "cat's whisker" wire. The current coming out of the other wire, just about two thousandths of an inch away, is boosted in volume a hundred fold.

Dr. John Bardeen and Dr. Walter H. Brattain made the key investigations in the Bell Telephone Laboratories that produced the transistor, while the program was initiated and directed by Dr. William Shockley.

Since electrical speech waves traveling between telephones can be amplified, the transistor will probably replace the vacuum repeater tubes now used on long distance and other telephone lines.

A superheterodyne radio set with about a dozen transistors instead of conventional tubes has been demonstrated and probably is the forerunner of a new family of radios.

Because it can oscillate as well as amplify, the transistor will be used to produce standard frequency tones and for other similar uses.

Germanium metal specially treated is the

semi-conducting material used, but other semi-conductors include silicon, some metallic oxides and other compounds. Semi-conductors have electrical properties intermediate between those of the metals and insulators.

Semi-conductors, copper oxide and selenium have been used previously to rectify alternating to direct current, and silicon has been used as a detector, particularly for microwave radio apparatus.

The transistor as now developed has a frequency limitation of about 10,000,000 cycles per second, but it is quite satisfactory in the television ranges.

Science News Letter, July 10, 1948

PUBLIC HEALTH

Later Years Are Rated Special Concern of Women

► BECAUSE the average woman is destined to outlive the average man, the middle and later years are of special concern to women, says Dr. Clive McCay, professor of nutrition at Cornell University.

"Furthermore," he says, "wives are usually younger than husbands, and like it or not, the average wife must face five to eight years of widowhood."

All of which means that older women must face the future realistically. "The best insurance for health during the late years is to cultivate good food habits throughout life."

Fixed food habits centered on poor diets such as living on tea and crackers insure poor health and disaster during the late years, he warns.

Pointing out that many more women than men are in homes for the aged, Dr. McCay says the time would seem ripe for women's organizations to demonstrate what they can do in solving problems for the aged. These problems involve economics, sociology, housing, employment, recreation, psychology, medical care and numerous other fields.

"These problems are solvable," says the Cornell scientist, "but few of us face them until our minds and bodies are too far exhausted."

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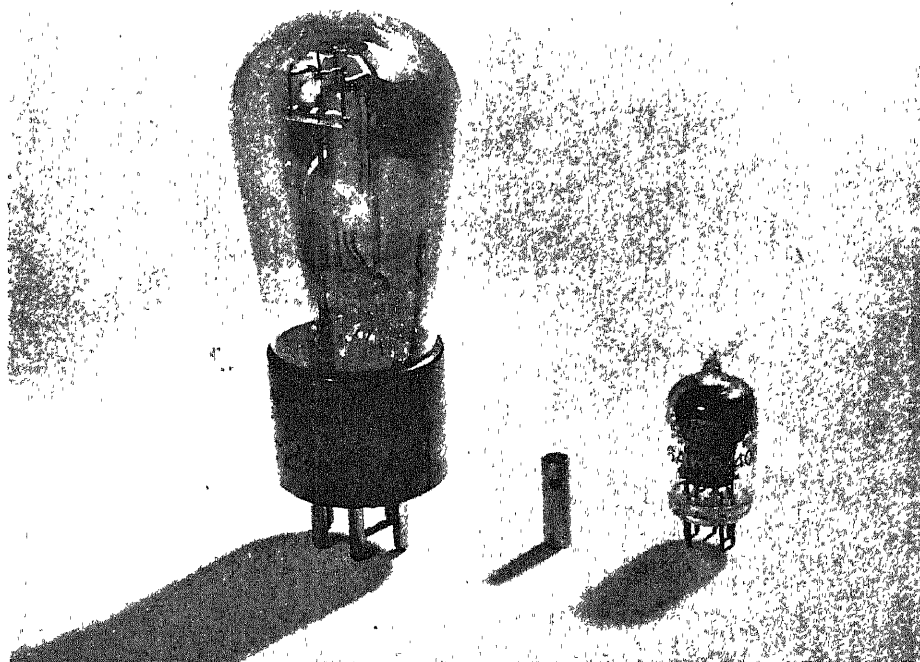
ASTRONOMY

Nova Formed by Big Shell Blown Off Star's Surface

► A NOVA or "new star" appears in the sky when a star literally "blows its top."

A star flares into a nova when a huge shell of very bright material is blown off its surface, Dr. Dean B. McLaughlin of the University of Michigan reported to the joint meeting in Pasadena, Calif., of the American Astronomical Society and the Astronomical Society of the Pacific.

The outburst, in which the star's apparent brightness may increase 10,000 times in 24 hours, is probably only a single eruption



TRANSISTOR—Overshadowed by two bulky vacuum tubes on either side, it may replace them in many electronic devices that will benefit from its small size, absence of glass envelope, plates and wires.

Linlithgow Library
General Agricultural Books

of energy, not a series or train of explosions, Dr. McLaughlin stated.

The spectra of two bright novae were carefully examined by Dr. McLaughlin. One of these exploding stars was found in the constellation of Perseus in 1901, the other in the constellation of Gemini, the twins, in 1912. Both stars remained bright only a short time and have since subsided to relative insignificance, the usual procedure for novae.

Light from a shell of gas approaching the earth at the rate of about 400 miles a

second was the most prominent feature of the spectrum of Nova Persei. It was present within a day after the star's maximum brightness and still prominent 18 months later. Many years later a nebula with exactly this same velocity was visible, expanding around the star.

There is some evidence of more than one outburst for Nova Gemminorum. But all the prominent structural features of the expanding shell were present within four days after the star's maximum light had been reached.

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stars themselves, he stated. Once again observations with the war-developed photoelectric photometer promise to outmode those made by earlier methods.

Stars in the famous cluster known as Berenices Hair and the Hyades, in the constellation of Taurus, the bull, were studied because in a cluster sufficiently far away from us we can assume that all the stars are at about the same distance. Thus distance is eliminated as a factor influencing the star's apparent brightness.

All stars brighter than photographic magnitude ten in the Coma cluster were observed during this study. Only some 50 of the 150 stars in the Hyades cluster were examined, the observing season being one of the poorest in years for Madison, Wis.

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ASTRONOMY

Hydrogen Gas Robs Star

➤ HOT clouds of hydrogen gas in an active state may rob a star's spectrum of the visible evidence that ample quantities of such elements as calcium, zirconium and magnesium exist in the star.

This theory was proposed by Dr. Jesse L. Greenstein of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas before the joint meeting of the American Astronomical Society and the Astronomical Society of the Pacific in Pasadena, Calif.

Most of the stars are much alike in the kinds and amounts of elements of which they are composed. But there are many exceptions. A certain peculiar star, about as hot as our sun, for example, appears to have only about 10% as much calcium, scandium, zirconium, magnesium, titanium and vanadium as does the sun. Other elements, however, are present in normal amounts, Dr. Greenstein found by analyzing spectra taken with McDonald's 82-inch reflecting telescope.

The apparent deficiency of these elements may be only a delusion, Dr. Greenstein reasons. Ionized hydrogen may rob the spectra of the very lines by which astronomers are accustomed to identify these elements.

From below the visible surfaces of stars such as the peculiar one studied by Dr. Greenstein may escape hot clouds of hydrogen gas, itself in an ionized state. This hydrogen, each atom of which lacks its single attendant electron, is greedy for electrons to such an extent that it may rob the nearest atoms of these elements.

The outward flow of some hotter ionized material from the interior of a star may thus upset the star's spectrum.

Brightness of Stars

The all-important relation between a star's brightness and its temperature may be simplified because of observations made by Olin J. Eggen of Washburn Observatory, University of Wisconsin.

Blue stars are known to be hot; yellow and red ones are relatively cool. A normal star of the same color and temperature as the sun probably has the same intrinsic brightness, Mr. Eggen reported at the astronomers' meeting.

In the past some stars of the same color and temperature as our sun have been considered brighter, some fainter. This is due largely to previous errors in measurement rather than to any complex nature of the

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What new benefits have been derived from benadryl, the anti-allergy drug? p. 21

Photographs: Cover, p. 19, Bell Telephone Laboratories; p. 21, The Glenn L. Martin Co.; p. 23, Boeing Airplane Co.; p. 26, p. 27, American National Red Cross.

MEDICINE

Treat Death-Causing Ills

Patients with diseases which are a leading cause of death in the nation will receive treatment at the new clinical center in Maryland when it is erected.

➤ IF THREE YEARS or so from now you have a baffling kind of heart disease, cancer or mental illness for which no cure has meanwhile been discovered, you may find yourself on the way to Bethesda, Md., suburb of the nation's capital, for study and treatment.

Because in about three years the U. S. Public Health Service expects to have completed here its 13-story brick hospital and research laboratory building, to be known as the clinical center of the National Institutes of Health.

The 500 patients of the hospital will be a select group. Select because they have an illness which is a leading cause of death or disability or both in the nation at that time. Right now, heart disease, cancer, mental illness and some tropical diseases are the ones slated for study. But, as Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, put it in announcing plans for the clinical center:

"If anyone cracks the cancer problem before the center is completed, we won't take any cancer patients. We will devote our efforts to some other unsolved disease problem of public health importance."

The building, as now planned, will house the National Institute of Mental Health and hospital facilities of the National Cancer Institute, the National Heart Institute and the National Institute of Dental Research. The hospital part of the building will be its smallest part, since the object of the center is research leading to improved treatment.

Patients while under study, however, will have the highest quality of medical care with the most modern facilities. They will come from all parts of the country, when referred by their doctors, hospitals and other health agencies on the basis of problems under study at the center at the time.

Whether patients who are able to pay will do so, perhaps through contributions to one of the National Institutes, or whether all care and treatment will be free has not yet been determined.

An efficient, smoothly performing professional staff will be ready as soon as the building is completed. "Colonies" of physicians and other medical researchers are already working together at Public Health Service and other institutions throughout the country, readying themselves and their skills for work at the center when it opens. In addition to the physicians and researchers, a staff of some 1,500 nurses, dietitians, orderlies and kitchen workers is planned.

Housing accommodations for patients' relatives and for patients returning for follow-up study a year after treatment are

included in present plans. An apartment hotel on the center's grounds will be built for them, if housing facilities in Washington are still overtaxed three years from now.

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MEDICINE

Anti-Allergy Drug Aids Shaking Palsy Patients

➤ BENADRYL, medicine which has brought relief to many a sufferer from hay fever and hives, now is helping patients with shaking palsy, known medically as paralysis agitans or Parkinson's disease.

Its successful use in ten patients is reported by Dr. Joseph Budnitz of Pittsfield, Mass., in the *New England Journal of Medicine* (June 17).

The drug is not reported as a cure for the condition, and Dr. Budnitz points out that the "good results obtained in this small

group may not withstand the test of larger series of cases."

All the patients, however, "noted considerable improvement in symptoms" as long as they continued to take the drug.

A 68-year-old man, sick for four years, with such palsied, trembling muscles that he could not feed or dress himself and had to be helped out of a chair is now, three months after starting benadryl, leading a normal business and social life. Within seven days after starting the treatment, he was able to get out of a chair alone, dress himself and use a knife and fork and could sit for one hour without tremor.

Patients who previously could only take a few shuffling steps were able to walk farther and lost the shuffling gait. Those who had been kept awake by muscle cramps at night found themselves able to sleep all night.

Four of the ten patients had to go on taking drugs like atropine or belladonna with the benadryl. The benadryl and the atropine seemed to reinforce each other's effect on the patient's symptoms.

Dr. Budnitz suggests that benadryl's effect may be due to its atropine-like action, or it may be due to enhancement of circulation of the part of the brain where the symptoms of paralysis agitans are initiated. A closely related drug, pyribenzamine, also used in hay fever, did not help the paralysis agitans patients.

Science News Letter, July 10, 1948



DIRECT READING GAUGE—Designed for use with the Martin 2-0-2's fast new under-wing fueling system, this gauge pulls down from inside the rubber fuel cell. A small ball, punctured with holes, on top of the gauge permits the fuel to trickle through the cylinder and drip out when the gauge reaches the level of gas in the cell. By reading the level at which it begins to drip, the mechanic can determine the fuel content.

BACTERIOLOGY

New Germ-Fighting Tactics

Bacteria are "smothered" to death with weed-destroying 2,4-D and viruses are subjected to the shattering vibrations of intense sound.

➤ "SMOTHERING" bacteria to death with 2,4-D, popular war-born weed-killer, and shattering viruses with intense sound waves are the latest steps in man's war against germs as reported by two groups of investigators in the journal, *Science* (July 2).

No immediate practical application is suggested in either report. But the work adds to knowledge which may lead to better methods for fighting disease germs.

The way 2,4-D, which is really a plant hormone or growth regulator, kills some kinds of plants is not definitely known. It has been thought to interfere in some way with plant respiration, or breathing. Bacteria which require free oxygen for their breathing are "smothered" by 2,4-D, report Drs. Winfield A. Worth, Jr., and Anne M. McCabe of Duke University School of Medicine. They react similarly to germinating barley seeds, which are stopped by the chemical. But bacteria that cannot live

with free oxygen, including such deadly ones as the germs of tetanus, gas gangrene and botulism, are not affected to any significant degree by 2,4-D.

Viruses that prey on bacteria, such as the bacteriophages, were subjected to the shattering vibrations of intense sound. Electron microscope studies showed that the ones that were resistant to the intense sound waves were all small sphere-shaped viruses. The ones disintegrated by the vibrations were relatively larger, tadpole-shaped viruses with more complex structure and frequently with pointed heads. These studies were made by Drs. Thomas F. Anderson, Shiela Boggs and Betty C. Winters of the University of Pennsylvania under a contract with the Navy and supported partly by a grant from the Raytheon Manufacturing Company whose magnetostriction sonic oscillator was used.

Science News Letter, July 10, 1948

GENETICS

Corn May Fight Pellagra

➤ PELLAGRA, hard-times disease among cornmeal-eating peoples, may some day be combatted with the very grain that is now blamed as its chief cause. Possibility of producing strains of hybrid corn with high content of niacin, the pellagra-preventing vitamin, is pointed out in *Plant Physiology* (April) by Dr. Frederick D. Richey of the U. S. Department of Agriculture, who works at the Tennessee Agricultural Experiment Station in Knoxville, and Dr. Ray F. Dawson of Columbia University.

A preliminary survey showed that the niacin content of different existing strains of corn is highly variable. Dr. Richey's own breeding experiments confirmed this, with niacin content in different lines ranging from less than 14 parts per million by weight to one exceptional inbred line that ran somewhat better than 53 parts per million. He was able to build up one hybrid that consistently had a niacin content well over 40 parts per million.

Drs. Richey and Dawson conclude that corn hybrids with niacin concentrations as

high as 50 parts per million can be developed.

That does not necessarily mean, however, that such hybrids are going to be developed, because other factors have to be taken into account. Such readily recognizable qualities as high yield per acre, sturdiness of stalk, and resistance to drought, diseases and pests are not likely to be sacrificed for the sake of an invisible improvement in the vitamin content of the grain. Individual farmers have individual preferences, which do not always have much to do with the intrinsic value of what they plant. And since different parts of the country have marked climatic and soil differences, the difficult job of producing a high-niacin hybrid would have to be done not once but several times.

Dr. Richey, a pioneer leader in the co-operative research program that gave hybrid corn to American agriculture, was recently given the U. S. Department of Agriculture's Distinguished Service Award.

Science News Letter, July 10, 1948

BOTANY

Irradiated Seed Deforms

➤ ATOM-BOMB RAYS powerful enough to kill men or animals, released at the first Bikini burst, failed to kill grains of seed-corn exposed on the decks of the target

ships, but did cause them to produce plants with many defects and abnormalities. First results of these experiments are described in detail in *Science* (July 2), just two years

and one day after the burst, by Drs. L. F. Randolph, A. E. Longley and Ching Hsiung Li, Cornell University botanists.

Two kinds of seedcorn were used in the tests, one a single-cross hybrid field corn, the other an inbred sweetcorn strain. Twenty-five packages, each containing from 1,500 to 2,500 grains, were exposed on ships in the target array, at varying distances from the center of burst. Similar lots were exposed to graded X-ray doses, from 5,000 to 25,000 Roentgen units. Finally, samples of both kinds of seed were kept untreated, for planting as controls.

As soon as the irradiated seed had been returned from Bikini, portions were planted at the U. S. Department of Agriculture experiment station at Beltsville, Md. Other plantings were made at the experimental farm of the California Institute of Technology, with all three groups of seeds included.

The untreated control seed produced plants of the uniform types expected of corn bred by modern methods. Both the Bikini seed and the X-rayed seed produced many abnormal plants. Some of these had twisted, crinkled, diminutive or otherwise deformed leaves. Other leaves, normal in size and shape, had areas lacking chlorophyll, the green food-making substance, or else completely dead spaces which often resulted in lengthwise splitting.

Tassels also were aberrant, producing as much as 50% of dead or otherwise abnormal pollen. Microscopic examination disclosed derangements and partial destruction of many of the heredity-controlling chromosomes in the cells.

X-rayed seed exposed to doses of between 10,000 and 15,000 Roentgens produced plants most nearly resembling those that came from the Bikini seed, although the similarities did not amount to identity.

Science News Letter, July 10, 1948

AERONAUTICS

Guggenheim Medal Goes To Aircraft Engineer

➤ THE prized Daniel Guggenheim Medal, given annually for achievements in aeronautics, has been awarded for 1948 to Leroy R. Grumman of the Grumman Aircraft Engineering Corporation, Plandome, Long Island. As recipient, Mr. Grumman takes a place along with Orville Wright, Glenn L. Martin, Donald W. Douglas, Juan T. Trippe, Lawrence D. Bell and other notables in aviation accomplishments.

The selection of the recipient of this medal each year is made by a board of 21 persons, including those formerly honored, together with representatives of the American Society of Mechanical Engineers, the Society of Automotive Engineers, the Institute of the Aeronautical Sciences and the United Engineering Trustees.

Advanced aircraft design both for Naval and civil use earned Mr. Grumman the medal.

Science News Letter, July 10, 1948

ANTHROPOLOGY

Refill German Science Gap

Two U. S. books on anthropological subjects that would have been burned as heretical by the Nazis have been translated into German.

➤ TWO AMERICAN books that Hitler would certainly have burned, had he known about them, have been translated into German and will soon be published by the firm of Sebastian Lux, of Murnau, a suburb of Munich. They are both on anthropological subjects, and they contain statements that by Nazi criteria could only have been judged as the rankest heresies.

One of the books is *Apes, Giants and Man* (Chicago University Press), by Dr. Franz Weidenreich, German-born but now an American citizen. Dr. Weidenreich had for years been conducting distinguished research on Peking Man in China, when he found it necessary to get out in a hurry to escape capture and internment by the Japanese invaders. He is now at the American Museum of Natural History in New York.

In his book he says: "As far as head index is concerned, the central European population is not longheaded and not Nordic . . . If the desirable mental qualities are really bound to longheads, and the undesirable ones to roundheads, as has been surmised, the good qualities should be present in only a very small percentage of the central European population. The overwhelming majority would have only bad qualities."

He also presents, side by side, profile pictures of the death mask of that ultra-Nordic, Frederick the Great of Prussia, and of the mummified head of the ancient Egyptian pharaoh, Rameses the Great, a member of the "Hamitic" race. They look enough alike to be at least cousins: the noses are especially similar.

The second book is *Mankind So Far* (Doubleday, Doran), by native-born Prof. William Howells of the University of Wisconsin. Here are some of the things he says, that would surely have made Nazi hair stand on end:

Of blood: "The blood of all men is precisely the same substance, and if you, a white American, were filled to bursting with transfusions of the blood of other races there would still be no chance that your skin would darken (or that of your children), or that you would start to speak Choctaw."

Of Nordics: "The traditional belief, and the one on which the writers on Nordic or 'Aryan' supremacy banked, was that the Nordics arose in a particular place as a unified, unmixed race, endowed by Providence with yellow hair and a knowledge of what is good for other people, and that all of European blondness can be traced back to them. There seems to be little back of the idea in actuality."

Of Jews: "It is not easy to say anything anthropologically sound about them . . . From what I have said already it should be plain that they cannot be of any extraordinary origin, and can only be descended from Mediterraneans of the various Neolithic types."

Herr Lux is also responsible for the publication of a considerable number of books by German authors on a variety of scientific subjects, mostly in small pocket format, and for a monthly popular science magazine titled *Orion*. These publications are designed to refill, as rapidly as possible, the terrible gap left in general scientific education in Germany by the interference of the Nazis.

Appropriately, the chief editor of the firm, Dr. Erich Lasswitz, is a man whom the Nazis persecuted. After a quarter-century as editor of the *Frankfurter Zeitung*, leading liberal daily of pre-Nazi times, he was thrown out of his job by Goebbels, and forced to live in retirement until liberated by American troops in 1945.

The magazine, *Orion*, is his brain-child. With the help of an 18-year-old niece, he worked up material for the first two issues in a kitchen used at the same time by his wife and another woman, because that was the only warm room in the house. Beginning thus away back of scratch, he has in two years brought *Orion's* circulation up to 55,000—and has a waiting list that will double that figure if he can ever get enough paper.

Science News Letter, July 10, 1948

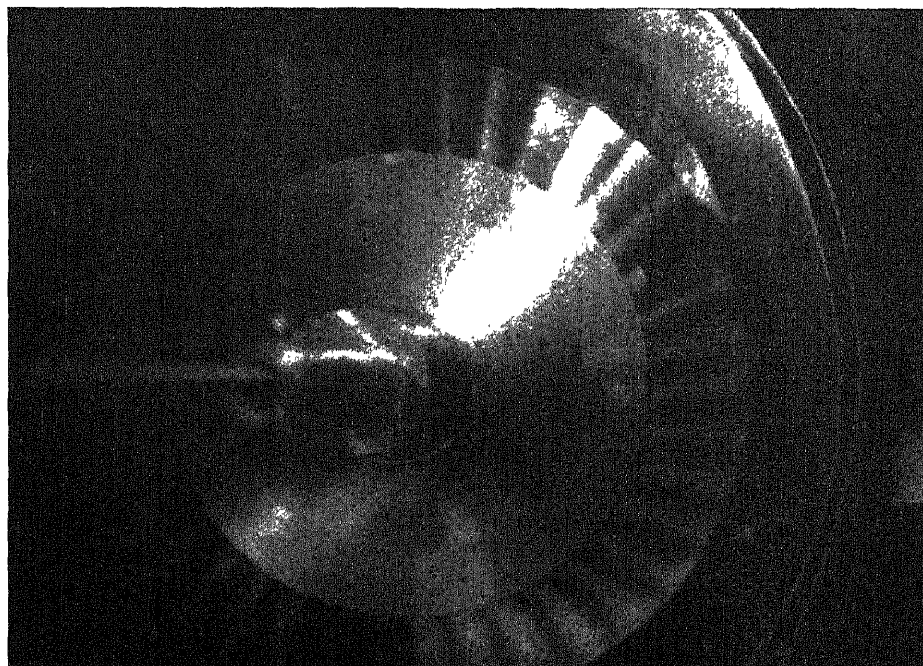
MEDICINE

High-Fat Diets Declared Bad for Heart Patients

➤ WARNING against a high-fat diet for patients with heart disease was sounded by Dr. Milton Plotz of Brooklyn at the meeting in Chicago of the American Medical Association. Deaths of 10 heart patients within seven months after being put on a high-fat diet, and much worse heart symptoms in 12 of another group of 17 within three months after being put on a high-fat diet, were cited by Dr. Plotz.

The high-fat diets had been given most of the patients as part of standard treatment for stomach ulcers. One of them was given the diet to "build him up." Ulcer patients, who have heart disease, Dr. Plotz warned, should be given frequent feedings low in fat.

Science News Letter, July 10, 1948



ULTRA-HIGH SPEED STUDY—This unusual picture shows what happened when a gas turbine engine was spun at 73,285 revolutions per minute. A blade was thrown. It can be seen at the upper right as it crashed into a copper protecting screen and automatically tripped a flash light to take its own photograph in one five-millionths of a second.

CHEMISTRY

Rediscover "Lost" Secret Of Stradivarius Varnish

► THE "lost" secret of the varnish used on Stradivarius, Guarnerius and other famous old Italian violins has been rediscovered and the varnish duplicated by Joseph Michelman of Cincinnati. Chemical and spectrographic analyses of small samples of varnish removed from authentic old violins show many things about its composition.

Recently Mr. Michelman, with the technical assistance of Otto Lang and Everett J. Shaw, has analyzed the red-brown varnish of a Francesco Ruggieri 'cello, made in 1691; he reports briefly on his results in *Science* (June 25).

The 'cello was double-coated, with a yellow under-varnish and a brown-red top coat. The red color was found to be due to madder, a vegetable dye. Spectrographic analysis showed the presence of considerable calcium, with smaller amounts of other metallic elements.

It was known that the type of varnish known as calcium rosinate is brown. When varnish of this kind was mixed with raw linseed oil and applied, the color was lost. However, when the oil was pretreated and the varnish then applied in thin coats and exposed at once to light, the color became permanent.

Mr. Michelman states in conclusion, "A brown-red varnish composed of alizarine-calcium rosinate and linseed oil, with turpentine as the solvent, has been prepared that possesses the desired depth of color, transparency and permanence in its dried and aged films."

Science News Letter, July 10, 1948

GENERAL SCIENCE

Better Fitting Clothes Part of Standards Study

► HOW MANY feet of concrete are needed to protect you from extremely high voltage X-rays and how to make children's clothes fit more children better are two problems now being solved by research at the National Bureau of Standards.

Dr. Edward U. Condon, director of the Bureau, described the new studies as guest of Watson Davis, director of Science Service on Adventures in Science, heard over the Columbia network.

A new 50-million volt betatron at the Bureau will be used to set standards for safety from the high voltage rays. Dr. Condon explained that safety standards are required by the use of high voltages in industrial applications of X-rays.

Mothers may have better luck fitting their youngsters with new clothes, thanks to research being conducted at the Bureau in cooperation with the Bureau of Home Economics of the Department of Agriculture which supplied measurements of more

than 100,000 children. The figures have shown what most parents have discovered that age is a poor guide to fitting their children with clothes.

When new, voluntary standards are adopted by industry, better fitting clothes can be expected by parents. Next clothing standards job will be a sizing system for teen-agers.

Other Bureau research reported by Dr. Condon included a standard of length 21-millionths of an inch long and calculating machines which work at nearly the speed of light.

A single wavelength of green light radiated by an atom of mercury with an atomic weight of 198 is being used as a measuring standard. This variety, or isotope, of mercury is produced in atomic piles by bombarding gold with neutrons. For measuring, this light gives scientists an indestructible standard, because all atoms of this form of mercury will always give the same wavelength of light.

With mathematics and statistics forming an important part of fundamental research in modern science, a National Applied Mathematics Laboratory has been established at the Bureau to speed the solving of mathematical problems. New computing machines, Dr. Condon pointed out, will work at speeds measured in millionths of seconds.

Science News Letter, July 10, 1948

ARCHAEOLOGY

Ancient Indian "Whodunit" Posed by Skeletons

► THE old but not very elegant lyric that demands to know "Who put the overalls in Mrs. Murphy's chowder?" has a newer counterpart about a still older and grimmer mystery: Who jammed dead Indians in the Delaware clambake pits?

The Smithsonian Institution has just come into possession of several skeletons found in some four-foot-deep pits near Lewes, Del., filled with oyster and clam shells. They were not regular burials, but the distorted positions of the skeletons indicated that the dead men had been forced into holes too small for them.

Dutch settlements came early to this part of the Delaware coast, yet there is no trace of white men's trade-goods with any of the skeletons. The finds are therefore presumably pre-Columbian.

The pits were discovered in the course of plowing some long-uncultivated land. First thing noticed was the unusually large size of the clam and oyster shells, although they belong to the species still found in the region.

Attention of the Smithsonian to the finds was called by the Sussex County Archaeological Association, which turned over all the material. The site has been examined by Dr. T. D. Stewart, Smithsonian curator of physical anthropology.

Science News Letter, July 10, 1948



METEOROLOGY

Daily U. S. Weather Map Gets That "New Look"

► THE U. S. Weather Bureau's daily weather map has a real "New Look." Three new things have been added:

1. The top line of the main map has been pushed considerably to the north, up to latitude 55 degrees. This will include such Canadian cities as Edmonton and Saskatoon, and the great sweeping spaces of the Prairie Provinces over which so much of our weather comes to us, especially in winter.

2. The small inset map showing the weather of the previous day has been enlarged to show conditions for the entire North American continent, and a considerable stretch of ocean on either side.

3. An entirely new inset map will show, as continuous lines, the altitudes at which an atmospheric pressure of 700 millibars exists. This is normal pressure for 10,000 feet altitude, but the height at which it can be found at any given moment varies, which makes it a matter of considerable importance not only for airmen but for many people on the ground whose business is affected by the weather. The same map will show temperatures, at intervals of 10 degrees Fahrenheit, on the 700-millibar "contours," and also existing weather fronts at the same level.

Science News Letter, July 10, 1948

SEISMOLOGY

Four Separate Quakes Recorded in Three Days

► FOUR separate earthquakes in three days were recorded in the last days of June.

The quakes began Sunday, June 27, with shocks south of the Alaska peninsula and under the Gulf of Mexico off the Guatemalan coast. A disastrous shock struck Japan June 28 and the region of the Samoan Islands was shaken the following day.

Scientists say that there is no evidence that such widely separated quakes are related in any way.

Although thousands of persons were killed and injured in the destructive Japanese quake, the one in Samoa was rated as just as strong a shock. The difference was that the former rocked a thickly populated area. Both were rated 7.25 on the seismologists' scale of magnitude.

Epicenter of the Jap quake was not on land, as had at first been suggested, but under Wakasa Bay, some 35 miles west of the ruined city of Fukui.

Science News Letter, July 10, 1948

E FIELDS

CHEMISTRY

Fuels from Nitrogen Find Many Industrial Uses

➤ **NITROGEN** from the air, which makes up four-fifths of what we take into our lungs at every breath, is a raw material from which fuels to supplement petroleum products will be made, particularly for special uses.

Certain nitrogen compounds, including ammonia and hydrazine, are actively being considered as fuels, the American Chemical Society was told at its meeting in Syracuse, N. Y., by L. F. Audrieth of the University of Illinois. The Germans, he said, experimented successfully with hydrazine to power submarines during the war. Concentrated ammonia, not the weak household solution, is already being used as fuel.

Nitrogen is one of the few inexhaustible raw materials since it is the major ingredient of the earth's atmosphere. This nitrogen is now being converted into useful chemicals by several processes. The most important of these is one by which the nitrogen is combined with hydrogen to form ammonia. From this ammonia many other nitrogen compounds can be made.

Among the newest of the basic nitrogen chemicals are hydrazine and hydroxylamine, both of which were largely laboratory curiosities ten years ago. Today, both are being produced in substantial quantities and new industrial uses are being found for them.

Hydrazine is a watery liquid which makes an excellent fuel because it burns with a hot flame and gives off no toxic gases. A chemist might call it a nitrogen analogue of the hydrogen peroxide long used for bleaching and other purposes. It is similar in chemical make-up but contains nitrogen instead of oxygen. Hydroxylamine stands between hydrogen peroxide and hydrazine, containing both nitrogen and oxygen.

Science News Letter, July 10, 1948

ASTRONOMY

Red Stars Grow Fat on Falling Dust Particles

➤ **SMALL**, red stars embedded in a dust cloud are growing fat on dust particles falling into them from the cloud, Dr. Otto Struve and Dr. Mogens Rudkjøbing of Yerkes and McDonald Observatories of the Universities of Chicago and Texas have discovered.

Very luminous blue and white stars in the dark nebula repel the dust by the outward pressure of their strong light, so that the particles cannot fall into their atmo-

spheres. But the small, relatively cool stars are bombarded by the bits of interstellar dust.

The dust particles seem to supply just the right amount of energy to give the spectra of these stars a number of peculiar bright lines. Dr. Struve characterized as "premature," however, any conclusion that all stars with these peculiar emission-lines are actually being born. He spoke at the joint meeting of the American Astronomical Society and the Astronomical Society of the Pacific at Pasadena, Calif.

Two years ago astronomers were thrilled by the announcement from Mount Wilson Observatory that Dr. A. H. Joy had observed some 40 stars with strong emission lines in their spectra. These stars were located in the vicinity of the great dust clouds in the constellation of Taurus, the bull. Dr. Joy suggested that the bright radiations of hydrogen, calcium and other gases might be connected with the presence of diffuse matter in the vicinity of these stars.

In extending this study, the McDonald astronomers obtained spectra of stars in the enormous opaque mass of cosmic dust located in the constellations of Ophiuchus, the serpent holder, and Scorpius, the scorpion, about half way between the bright stars Rho Ophiuchi and Sigma Scorpii. Stars in this region are mostly faint, and there are few of them. The dark cloud, about two million billion miles away, practically obliterates the light of the stars behind it.

The bright blue-white stars in the cloud were found to have no abnormalities in their spectra, indicating that they were not influenced by the nebulosity. Among the faint stars, a nest of them were found to have peculiar emission lines. Six such stars are close together, located in one of the densest regions of the dark cloud. One of these stars also varies in brightness, indicating that it is definitely associated with the dust cloud.

Science News Letter, July 10, 1948

INVENTION

"Preference Recorder" Registers Your Opinion

➤ **HOW WOULD** you like to be able to let the management know that its show is good, swell, punk, lousy, just by turning a button? A device to do just that has been invented, and U. S. patent 2,444,327 has been issued on it, to Alan W. Baldwin of New York.

It is a compact little box, with a dial and a hand-operated indicator that can be moved from neutral to plus one and plus two to indicate degrees of approval, or to minus one and minus two to register distaste. Inside, an electric mechanism writes a stepwise graph on a moving tape. This can be taken out and sent for analysis to radio or television headquarters—or even to the worried managers of a political convention.

Science News Letter, July 10, 1948

RADIO

Doctors Out Making Calls Are Paged by Radio

➤ **PAGING** doctors away from their offices will be the job of a special radio station to be erected in New York. Telanserphone, Inc., has now been granted a construction permit by the Federal Communications Commission to test the feasibility of the plan.

The station will provide only one-way transmission. It will serve the immediate New York area. Each doctor enrolled for the service will carry a small portable receiver. Each will be assigned an individual code number. This will be repeated on the air at intervals until the doctor reports to the station by telephone.

The theory behind the plan is that by it any individual doctor when out making calls may be located more easily than by the present procedure in which he is located by telephone, where frequently many calls must be made.

Science News Letter, July 10, 1948

ARCHAEOLOGY

Sinai Peninsula Inhabited Since Neandertal Times

➤ **THE** Sinai peninsula, through which the Children of Israel passed during their long wanderings in search of the Promised Land, served as a land bridge between Africa and Asia long before their time, new evidence discloses. Wendell Phillips, leader of the University of California African Expedition, tells in *Science* (June 25) of recent discoveries of stone implements showing that the region has been inhabited successively by Neandertal and Cro-Magnon men of the Old Stone Age, tribes of Neolithic or New Stone Age date, and a people of the transition period between the Neolithic and the beginning of the Age of Metals.

Egyptians were in Sinai from the earliest development of their civilization in the valley of the Nile, the expedition's archaeologists found. The great attraction for them was the turquoise mines of the region, which were worked by slave labor under Egyptian overseers.

Beginnings of the Semitic alphabet, which eventually developed into the beautiful characters of Hebrew script, date from these turquoise-mining days. Most of the letterings found on the rocks are fragments of tomb inscriptions, commemorating captive Semitic tribesmen who died under the harsh working conditions of the mines.

The expedition has also worked in Egypt, especially in the desert west of the Nile. Fossil remains of primitive whales and other aquatic animals found there show that this part of Africa was sea bottom in the pre-human millenia of the earlier Age of Mammals. Here also were found stone implements indicating long human occupation through the Old and New Stone Ages.

Science News Letter, July 10, 1948

MEDICINE

Regional Centers for Blood

Blood products already have saved many lives. Patients in cities and hamlets will get its benefits soon when a nation-wide chain of blood centers is established.

By JANE STAFFORD

➤ MR. X, aged 45, was sick, could not eat, could not work, would soon die if help could not be gotten for him. He was a victim of poisoning. The poison came from his teeth which were abscessed and in bad shape. They had been getting worse for years. Any ordinary man would have had the bad teeth drawn years ago and stopped the slow poisoning.

But Mr. X was not an ordinary man. He was a hemophiliac. This means that he had inherited through his mother the kind of blood that does not clot normally when shed. It was not much consolation to Mr. X to know that men and boys in some of the former royal families of Europe were cursed with the same blood condition.

Dying of Poisoning

His dentist and his doctor knew that Mr. X was dying of poisoning. They knew the only way to save him was to get those bad teeth out, clean up the pockets of poisonous pus in his gums, and give him new teeth so he could eat real food that would give him back his strength. But they knew, too, that when he was a young fellow he had one tooth extracted and nearly bled to death afterwards.

Mr. X lives in a small town in western New York. Only 16,000 population, it is better off than many towns of its size. It has doctors, dentists, and a 150-bed hospital. But it is no medical center, where the latest scientific discoveries are available for treating the sick.

Yet there was a way to save Mr. X from his slow poisoning without risk of his bleeding to death. And because Mr. X lived within the Rochester Regional Blood Center area he was saved. Today he is up and about, has a set of new good teeth and "feels like a million dollars."

What saved his life were two products made from blood. One is called antihemophilic globulin. It comes from normal blood and aids in making hemophiliac blood clot temporarily. Mr. X was given

shots of this before his teeth were pulled. As a result, he did not bleed any more than an ordinary man would after having his teeth extracted. To make doubly sure Mr. X would not bleed too much, his gums were packed with fibrin foam. This is another product extracted from blood which makes blood clot as it oozes out of tiny blood vessels. Surgeons use it in many operations where bleeding is hard to control.

These two blood products did not cost Mr. X anything. He had of course to pay the doctor who gave him the products. But on his hospital bill were two lines that cost him no money, reading something like this:

Antihemophilic globulin from American Red Cross.

Fibrin foam for packing from American Red Cross

The experience of Mr. X is almost unique today. Only in some of the large medical centers could it be duplicated very often. The blood products that saved his life are new and not in too abundant supply. But when the National Blood Program gets its projected nation-wide chain of blood centers established, Mr. X and others like him in big cities, small towns and on farms will receive its benefits.

Rochester Center

The first of these centers was established in Rochester, N. Y., in January. From Rochester bloodmobiles go out into the towns and villages throughout the 12-county region on regularly scheduled days. In each place visited a donor station is set up, like the ones which during the war collected 13,326,242 pints of blood for our armed forces. From these donor stations the blood is taken back to Rochester for testing, typing, and preserving treatment. Then it is returned to the hospitals and doctors throughout the



RED CROSS BLOODMOBILE—Mobile units such as this one entering Hornell, N.Y., transport technical equipment and supplies to set up temporary centers in outlying communities to collect blood for the regional center where it will be turned over to the doctors and hospitals of the region after processing.



CONVERTING BLOOD—Whole blood is converted into plasma from which life-saving blood-products are made.

region as they need it. When the whole blood is too old for use in transfusions, it is returned to the center at Rochester. Here the red cells and plasma are separated. From the surplus plasma are made the products such as those which saved Mr. X.

The existence of these and other life-saving blood products is due primarily to researches by Dr. Edwin J. Cohn of Harvard. Dozens of different components of blood are now known to exist. Many of these have been extracted and put to medical use. Part of the Red Cross National Blood Program's purpose is to assist scientists in finding more uses for these by-products of the blood it will collect. The substances are by-products, since they are separated from plasma after the whole blood has become too old for use in transfusions. Separation of the products and packaging for medical use will be done by pharmaceutical houses. The Red Cross will pay for this, though the products will be supplied without charge.

Collection of whole red blood, 3,700,000 pints of it each year, is the main object of the National Blood Program. The 3,700,000-pint figure is the amount medical authorities estimate are needed each year for peacetime use in saving the sick and injured.

Benefitting already from the National Blood Program are countless patients in the Rochester region alone. There is six-

year-old Bobby of Elmira. Like Mr. X, Bobby has hemophilia. He has been coming to the hospital for years for blood transfusions. Every time he falls down and scrapes his knees he is likely to bleed so much that he needs a transfusion. During 1946 he had four blood transfusions. He has had two with blood from the Rochester center since its establishment in January this year.

Aids Hemophiliacs

Now his parents and doctor need not worry about whether there will be blood when he needs it. Nor do they need to worry about the cost of the blood. Even better, they have learned now about the antihemophilic globulin which helped Mr. X. This material will not cure hemophilia. But it can be given to Bobby off and on to see him through the period of losing his baby teeth, having his tonsils out if necessary, and protecting him against the injuries any active boy is liable to.

Serum albumin is helping another child in the Rochester region. This material proved a great boon when it became available during the war, because it could be used as a substitute for blood plasma. It had the great advantage of taking far less space in transit than plasma.

As the war drew to a close, medical scientists were discovering new uses for serum albumin besides that of substitut-

ing for plasma in transfusions. One such use is for treatment of a kidney disease called nephrosis. A five-year-old youngster in the small town of Hornell has nephrosis. His doctor knew serum albumin would help him to recover. But the material as prepared and sold commercially is very expensive. Enough for one treatment costs about \$80. And the child will need many such treatments.

The family could not meet this expense. The hospital managed to get enough for one treatment, but that was the limit of its resources. When the Rochester regional blood center was opened, the hospital sent word to the child's doctor and parents that it could now get more serum albumin, without charge. The five-year-old was brought back to the hospital and got the equivalent of \$300 worth of serum albumin. When he needs more, it will be available.

Children are not the only ones being helped. A 71-year-old man got four pints of blood to see him through an operation for removal of an eye. A young woman victim of Hodgkin's disease is getting continued transfusions of blood so that she can go on taking nitrogen mustard treatment for her illness.



Data from Four Furnaces Recorded by SPEEDOMAX In Lab at Notre Dame

For comprehensive studies of the grain growth which occurs during annealing of aluminum, metallurgists at University of Notre Dame use this four-point Speedomax Recorder.*

Speedomax gives them:

- 1) Accurate, detailed temperature records for four furnaces heated simultaneously.
- 2) An expanded time scale for precisely legible records of test duration.

For suggestions on range and speed for a specific application, write to us.

*AIME, Metals Tech., Sept. 1947

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MEASURING INSTRUMENTS • TELEMETRY • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES

Jr., Ad N-38A-247 (1b)

Do You Know?

As much as 50 barrels of water may evaporate from the surface of the leaves of a large *elm tree* in a single hot summer day.

Corn-and-cob meal, made by grinding the corn and the cob together, has high value for *cattle feed*; the cob is found to be 64% as valuable as the grain itself for fattening purposes.

Barite is a mineral used as a weighing agent in heavy drilling oils, as a filler in rubber, a pigment in paints, a flux in glass melts, and in the manufacture of barium chemicals.

An old Indian belief that *beech trees* are never struck by lightning probably comes from the fact that wild beeches grow in groves with taller trees that are more apt to be struck.

Seismologists say that the *earth* shakes itself about 85 times a day; most of the shakes are little ones but not too small to be picked up by sensitive seismographs.

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A mechanical engineer comes in every week on his lunch hour for a transfusion. He has leukemia. The blood will not cure him, but it may help to keep him alive until a cure for this disease or an effective aid is discovered.

Three pints of whole blood before operation, and two pints immediately after and two pints daily for several more days were needed for another patient when his enormously enlarged spleen was removed. A 50-year-old woman suffered 12 years with ulcers from varicose veins on her legs. They are healing now, thanks to red blood cells sprayed on the

ulcers. The red cells were separated from whole blood returned to the Rochester center because it was too old for use in transfusion.

These are some of the special, unusual cases in which blood or its products are used. In the Rochester region, as elsewhere in the nation, come the ordinary emergency demands for blood to save an accident victim, a mother hemorrhaging unexpectedly in childbirth, a patient with a stomach ulcer that erodes a blood vessel and causes hemorrhage that could be fatal.

Second of three articles on blood.

Science News Letter, July 10, 1948

PSYCHOLOGY

Black Not Always Black

➤ BLACK is not always black, nor is white white.

If you have access to a projector for slides or color transparencies, you can prove this to yourself and your friends with a dramatic experiment. Just how it works is revealed by Dr. Hans Wallach of Swarthmore College, in the *Journal of Experimental Psychology* (June).

Cut a disk from black paper and hang it in the doorway of a room. Arrange your projector so that its light will be focussed on the disk and then will shine on the ceiling of the adjoining room out of sight of the "audience."

Now dim the light in the room. The disk, instead of being black, will appear white. But keep on shutting out all illumination until your room is completely dark, except for the illumination on the disk. Now that inky black disk will shine like a bright moon.

Suppose next you gradually cut down the light shining from the projector. What will happen? You may be surprised to find that it still looks luminous—not white or black—although as the light decreases, it becomes dimmer.

Whether an object looks white, black, gray, or luminous depends not only upon the illumination of the object and the light reflected from it, Dr. Wallach found, but upon the difference in light reflected by the object and its surroundings.

He tested this out and worked out the mathematics of the relations by using an ingenious combination of two projectors, one rigged up to project a disk of light on a white screen, the other fixed so that it would project a ring of light in such a way that it would form an outer edge for the disk.

When he kept the brightness of the disk the same and varied the brightness of the ring, he could at will change the appearance of the disk all the way from white to dark gray. The brighter the ring, the darker the disk would become. And when the ring

was made to look a dark gray, the disk then became white.

Cut out the ring altogether, and the disk ceases to look either white or gray and becomes a glowing moon.

In another experiment Dr. Wallach rigged up two sets of disks and rings, in which the area of the ring was the same as that of the disk. It was arranged so that in one set the ring was darker and in the other the disk was darker. The observer was allowed to vary the intensity of the second disk, and was requested to match the color of the two sets in this way.

It was found that when the colors matched to the observer's satisfaction, the proportion of brightness between disk and ring was just about the same in both sets, although one was much dimmer than the other. The small difference in ratio indicated that for the same intensity ratio, the object will appear a lighter gray if disk is brighter than the ring, than if the ring is brighter than the disk.

Science News Letter, July 10, 1948

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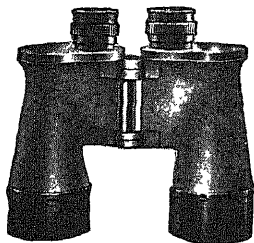
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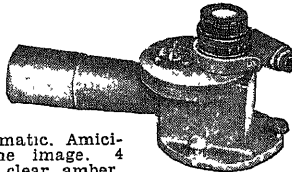
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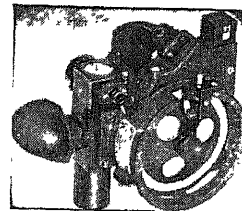
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ENGINEERING

Hope To Extract More Oil

► MORE OIL from so-called exhausted petroleum wells is hoped to result from research on the mixing of oil and water under high pressure, the American Chemical Society was told by Prof. Ernst A. Hauser and A. S. Michaels of the Massachusetts Institute of Technology.

Secondary production of oil from wells from which the free-flowing crude has been removed by pumping is always important but particularly so now with decreasing reserves and the increasing demands for petroleum products. Primary pumping takes from the oil-bearing sands about one-third of the crude they hold, it is estimated.

Another third can be recovered by various pressuring methods. In these, water, air, or natural gas taken from the oil are pumped down central wells to help the flow of the oil to the out-take wells. There are other methods also employed, but the amount still unrecovered is still too great.

The term underground oil pools, often used, is misleading. The crude under ground is largely held in the pores of rocks and sand. The movement of the oil from locations away from the well to replace the crude which the pumps have removed is

slow. Pressure behind it helps, but there is still much held in or clinging to the tiny pores of the sandstone that repels the water used in pressurizing. A way is now sought to reduce this repulsion. This would make it possible to displace and recover more oil from either abandoned or existing wells.

In the study reported before the meeting, a new machine, called a high pressure tensiometer, is being used. It enables scien-

tists to measure the mixing of oil and water at pressures and temperatures as great as those encountered in deep oil wells.

The tensiometer is a heavy stainless steel box with thick glass windows which is filled with water in which a drop of oil is suspended from the tip of a thin metal rod. The temperature of the contents can be raised up to 350 degrees Fahrenheit while pressures up to 10,000 pounds per square inch are applied. The mutual repulsion of the two liquids is calculated from the shape of the oil drop, the changes of which are recorded with a microscopic camera.

Science News Letter, July 10, 1948

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publications direct from issuing organizations.

CALCULATIONS OF QUANTITATIVE ANALYSIS—Philip W. West—Macmillan, 162 p., \$2.75. A textbook on the mathematics of chemistry.

CREATIVE CERAMICS: A Primitive Craft Becomes a Fine Art—Katherine Morris Lester—Manual Arts Press, 213 p., illus., \$3.75. A most attractive hobby or art described in detail and illustrated with excellent photographs.

GEM CUTTING—J. Daniel Willems—Manual Arts Press, 224 p., \$3.50. Details of the art for both amateurs and professional gem

cutters. The author is himself a hobbyist.

HOW FAMILIES USE THEIR INCOMES—U. S. Dept. of Agriculture—Govt. Printing Office, 64 p., illus., paper, 30 cents. The story, largely in graphs, of where that dollar went.

THE HUMAN BODY AND ITS FUNCTIONS: An Elementary Textbook of Physiology—C. H. Best and N. B. Taylor—Holt, Rev. ed., 500 p., illus., \$3.60. This new edition of a well-known text has been rewritten to include recent outstanding discoveries in the field. The presentation is planned to be less elementary.

JUNIOR ASTRONOMY CLUB'S GUIDE TO SUMMER OBSERVING—Donald Hirsch, Ed.—Junior Astronomy Club, Hayden Planetarium, 34 p., illus., paper, 35 cents. Useful information and hints for all amateur astronomers.

NEW WORLD OF SCIENCE—R. Will Burnett, Bernard Jaffe, and Herbert S. Zim—Silver Burdett, 504 p., illus., \$2.80. A dramatically written and abundantly illustrated high-school textbook intended to help students to think critically and use scientific methods as well as to provide them with a store of useful scientific facts.

POWER, MACHINES, AND PLENTY—Gloria Waldron and J. Frederic Dewhurst—Public Affairs Committee, 32 p., illus., paper, 20 cents. A primer of economics based on a book "America's Needs and Resources" published by Twentieth Century Fund.

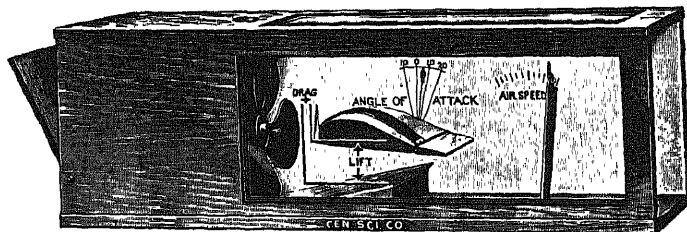
SECOND SESSION OF THE GENERAL CONFERENCE OF THE UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION, Mexico City, November 6-December 3, 1947—Report of U. S. Delegation With Selected Documents—Govt. Printing Office, 186 p., paper, 35 cents. Reporting the program of UNESCO.

SURVEY OF UNIVERSITY PATENT POLICIES: Preliminary Report—Archie M. Palmer—National Research Council, 170 p., \$1.50. Includes discussion of the relation of the patent policy to university research and the educational program.

WINGS AROUND THE WORLD: The Story of American International Air Transport—Burr W. Leyson—Dutton, 192 p., illus., \$3.00. Relating how our network of airlines was built up until now, according to the author, no point on earth is more than 60 hours distant by air transportation.

Science News Letter, July 10, 1948

FLIGHT DEMONSTRATOR



The Congressional Aviation Policy Board state in their report: "An aeronautical educational program should be established throughout the public-school system in order that basic problems of the air age—the rudiments of flight—are well understood by future generations." This flight demonstrator will aid greatly in teaching the rudiments of flight.

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ENTOMOLOGY

Glue Mosquitoes to Wires For Flight-Motions Study

➤ EXPERIMENTERS with miniature model airplanes might well look to entomology for pointers in handling ultra-small flying machines of the most fragile kinds. For Prof. Marshall Laird, of Victoria University College, in Wellington, New Zealand, has succeeded in gluing live mosquitoes to the ends of slender brass wire mounts, without harm to the insects. (*Science*, June 18)

The technique was developed in the course of studies of mosquito wing motions during flight, with the objective of making the insects fly "in place" before the lens of an ultra-highspeed camera. They were first lightly anesthetized, then attached to the wires with a touch of quick-setting glue on the backs of their thoraces or chest regions.

When the desired photographs had been taken, the mosquitoes were released by sharp taps on the wires. Returned to their feeding cages, they lived nearly as long as control insects on which no experiments at all had been performed, thus demonstrating that the mounting method had not interfered with normal functioning.

Science News Letter, July 10, 1948

MEDICINE

Chemicals Check Bleeding In Many Body Disorders

➤ SCORES of patients bleeding from leukemia or other disorders have had their bleeding stopped by doses of a dye, toluidine blue, or another chemical called protamine. For an exhibit demonstrating this discovery, Dr. J. Garrott Allen and associates of the University of Chicago received the American Medical Association Gold Medal at the association's meeting.

The chemicals do not cure leukemia, and they are not effective in hemophilia, hereditary bleeder's disease. They were discovered during search for means of combatting hemorrhage in irradiation damage, as from atom bombs. They stop the hemorrhage in irradiated dogs, but prolong life only slightly.

Science News Letter, July 10, 1948



Save-the-Redwoods

Send 10 cents each for these attractively illustrated pamphlets: "A Living Link in History," by John C. Merriam... "Trees, Shrubs and Flowers of the Redwood Region," by Willis L. Jepson... "The Story Told by a Fallen Redwood," by Emanuel Fritze... "Redwoods of the Past," by Ralph W. Chaney. All four pamphlets free to new members—send \$2 for annual membership (or \$10 for contributing membership).

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20th Century SPEECH AND VOICE CORRECTION

Edited by EMIL FROESCHELS, M.D.

AMONG the youngest branches of Science, ranks the physiology, pathology and therapy of speech and voice. The tremendous social importance of good speech and voice has urged scientists to contribute relatively more to this branch of science than to any other. Because of this, speech and voice therapy has developed to a remarkably high degree.

The editor has endeavored to point out the various aspects of speech and voice correction, and has chosen numerous collaborators well known in the field, to aid him in this task.

CONTRIBUTORS INCLUDE:

ELLY SITTING, *Speech and Voice Therapist, Federation for the Handicapped, New York*; JEANETTE O. ANDERSON, Ph.D., *Director, Speech Clinic, Rockford College, Rockford, Ill.*; HELEN HULICK BEEBE, *Speech Clinician, Easton Hospital, Penna.*; MARTIN F. PALMER, Sc.D., *Director, Institute of Logopedics, Wichita, Kansas*; SHULAMITH KASTEN, *Speech Correctionist, Speech Clinic, Brooklyn College, N. Y. C.*; HELEN SCHICK LANE, Ph.D., *Principal, Central Institute for the Deaf*; AUGUSTA JELLINEK, Ph.D., *New York*; SAMUEL D. ROBBINS, *Professor of Psychology, Emerson College, Boston, Managing Trustee, Institute for Speech Correction*; S. RICHARD SILVERMAN, Ph.D., *Central Institute for the Deaf*; DOROTHY DOOB, Ed.B., *Instructor, Dept of Speech and Dramatics, Hunter College, New York*; EUGENE SCHORR, M.D., D.D.S., *New York*; ANNIE MOOLENAAR-BIJL, *Speech Clinic, Laryngological Department, University Hospital of Groningen, Holland*; MARY WOOD WHITEHURST, *Formerly Supervisor of Auricular Training of Hoff General Hospital, Santa Barbara, Cal.*; WILLIAM G. PEACHER, M.D., *Philadelphia, Pa.*; O. R. BONTRAGER, *Director of the Reading Clinic, State Teachers College, California, Pennsylvania*; CHARLES H. VOELKER, M.A., *Head, Department of Physics, Washington College, Chestertown, Md.*; FREDERICA SCHMITZ-SVEVO, *Voice and Speech Therapist of the Department of Oto-Rhino-Laryngology, City Hospital, Welfare Island, New York, N. Y.*; CHARLES R. STROTHER, Ph.D., *Associate Professor of Speech and Psychology, University of Iowa.*

FROM THE TABLE OF CONTENTS:

Anatomy and Physiology	Prosthetic Therapy of Cleft Palate
Aphasia and Its Treatment	Pathology and Therapy of Stuttering
Paragrammatism in Children	Cluttering (Paraphrasia Praecept)
Dysarthria	Hearing Rehabilitation
Alalia	Disorders of Articulation Due to Gunshot Wounds of the Head and Neck in World War II
Psychic Deafness in Children	Remedial Reading and General Semantics
The Education of the Deaf Child	Education of the Speaking Voice
Acoustic Education in Children	Education and Re-education of the Singing Voice
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⚙️ **LIGHT ATTACHMENT** for telephones, recently patented, illuminates the dial on the ordinary desk-type instrument. It has a clamp to embrace the base portion above the recess, and holds a small electric bulb under a reflector over the dial.

Science News Letter, July 10, 1948

⚙️ **TABS FOR TEMPORARY** use in marking library cards are half-inch circular pieces, with tiny rectangular projections to extend above the cards when attached. Each disk has an adhesive on one side which, without moistening, holds the tab in place. Tabs stay on in the files and yet can be removed when desired by simply peeling off.

Science News Letter, July 10, 1948

⚙️ **MOTO-SANDER**, designed for use in the home and to operate on the ordinary household current, weighs 2.5 pounds, has a rubber-cushioned sanding pad 2.25 by 5.5 inches in size, and delivers 7,200 strokes a minute. It can finish tight corners in furniture and can be used for wax polishing.

Science News Letter, July 10, 1948

⚙️ **TINY HEARING AID** has a receiver so small that it can be recessed in the ear-mold and worn inside the ear opening. It uses a very small battery, and a printed



electrical circuit on a plastic wafer about the size of a card of paper matches, as shown in the picture.

Science News Letter, July 10, 1948

⚙️ **ELEVATOR LADDER**, adjustable in length and operated by electric or gasoline power, will carry 500-pound loads to a

maximum height of 40 feet. It has two aluminum ladder-like tracks that hold the four wheels of a loading platform. Upper ends of the tracks are curved over so that the load is delivered to the floor.

Science News Letter, July 10, 1948

⚙️ **RAYON CLOTHESLINE** coated with vinylite plastic is waterproof and easy to clean. It is claimed to have unusual strength and a very low stretch rate, and also to be easier to tie than most lines.

Science News Letter, July 10, 1948

⚙️ **RADIO TRANSMITTER-RECEIVER** for light planes weighs only nine pounds but provides tower communications, low course ranges, marker beams, standard broadcast frequencies, loop direction finding, six VHF transmitting channels and a cabin intercommunication system. A single switch shifts from one service to another.

Science News Letter, July 10, 1948

⚙️ **ELECTRIC KNIFE SHARPENER**, suitable for home or restaurant use, has an abrasive sharpening wheel, directly driven by a motor, and clips to hold the blade against guide plates which direct the edge of the knife against the abrasive wheel at the proper angle. The user draws the blade through the clips.

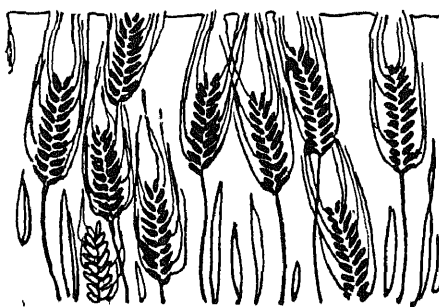
Science News Letter, July 10, 1948

• Nature Ramblings by Frank Thone •

➤ **THE WORLD'S** first farmers cultivated the rich, easily-worked, high-yielding soils on the banks of rivers—the Nile, the Tigris-Euphrates, the Indus, the Yangtze. Their fields were flat, so that straight furrows were possible and eventually came to be considered the mark of agricultural skill and virtue. Erosion on the flatlands was no problem, so the advantages of clean cultivation could be exploited without offsetting loss of topsoil—which wouldn't have counted much in those deep alluvial lands, anyway. Main crops were the same species which the farmers' pre-agricultural ancestors had gathered as wild grains—barley and wheat towards the west, rice in the east.

So long as the world's civilized population was small and the river plains sufficed to keep it fed, no great trouble came. To be sure, town fought town in Mesopotamia over water rights and field boundaries, and the long, narrow ribbon that was Egypt sometimes broke into two or more pieces that went to war with each other. But these were fights of men against men, not attacks of men against the land itself.

Force-of-Habit Farming



When the earth's greatly increased population made it necessary to clear upland forests and plow sloping lands, the foundations of our present worries were laid. Topsoil is much thinner on the hills, yet erosion is much faster, so that the "hastening ills" to which the land is prey come on at a cumulative rate. The evil is further accelerated when farmers defiantly plow

straight furrows up and down hill, inviting runoff water to cut runnels that finally coalesce into gullies of disaster.

Thus far, our only remedy has been to attempt a conversion of hillsides into more or less reasonable facsimiles of river-banks by contour plowing and terracing. On the limited flatlands thus created we keep on growing the same crops. Indeed, we pay the homage of high admiration to the Malays of southeastern Asia and the adjacent islands, who have transformed whole mountainsides into vast stairways of seasonal swamps in which they can grow rice.

Though we get a great deal of our food from hillside fields, we keep on planting the same riverside crops our prehistoric forebears first cultivated, perhaps as much as 10,000 years ago. It would seem more rational to try to find some high-yielding food plants that could be grown on sloping land without baring it to erosion by clean cultivation. That doesn't seem to be attracting much research effort as yet.

Science News Letter, July 10, 1948

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JULY 17, 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



"Eye-Dropper" Technique

See Page 40

A SCIENCE SERVICE PUBLICATION

MEDICINE

New Typhoid Remedy

Chloromycetin, which is extracted from a mold, will bring the fever of patients with this disease to normal within three days. Not available at present.

➤ TYPHOID FEVER patients next fall or early winter may get a new medicine which will bring their fever to normal in three days instead of the usual three or four. But right now there is not an ounce of this precious new drug available anywhere.

The drug is chloromycetin. Like penicillin, it was extracted from a mold. But, unlike penicillin and streptomycin, it is a potent remedy for both typhoid fever and the quite different disease, scrub typhus, which attacked more than 6,000 American troops during the Pacific campaign in the last war. Neither penicillin nor streptomycin is effective in these two diseases, nor has any other drug been as effective against them.

Results of the first field test of the new drug as a remedy for scrub typhus were reported by Dr. Joseph E. Smadel of the Army Medical Department Research and Graduate School. He has just returned from Kuala Lumpur, Federation of Malaya, where he headed the Army's scrub typhus research unit. With him in the unit were Dr. Theodore E. Woodward of the University of Maryland, Col. Cornelius B. Philip, U. S. Public Health Service and Maj. Robert Traub and Lt. Herbert L. Ley of the Army's Research and Graduate School.

All 40 of the scrub typhus patients treated with the new drug recovered. So did all 11 typhoid fever patients, though two of these were so sick, with hemorrhages and perforated intestines, that by all the previously known odds they should have died.

The discovery of the drug's effectiveness as a typhoid remedy was made by accident. In the early stages, scrub typhus cannot always be diagnosed exactly. So two patients thought to have this Pacific disease were treated with chloromycetin before the doctors could know that actually they had the entirely different typhoid fever.

Chloromycetin was obtained in crude form, from a mold in soil from Caracas, Venezuela, by Dr. Paul Burkholder of Yale. Scientists at Parke, Davis and Co. worked with it and obtained it in crystalline form. They are so far the only company making it and they have only made it on a laboratory scale for preliminary testing. Recently Dr. Smadel asked for three more ounces to send to Kuala Lumpur to finish the trials there.

The company said it had none left. Then after quite a search the three ounces were found in a chemical laboratory awaiting analysis. This precious last bit was sent to Malaya.

There won't be any more, Dr. Smadel

was assured, until fall or early winter, by which time larger-scale production will be under way. Then there should be enough for further research and for treatment of a limited number of scrub typhus patients in

MEDICINE

Polio Clues in Environment

➤ TO FIND new clues for solving the polio problem, look into the way of life, the soil, water, diet and other factors of the environment. Do this in regions of the world that have had very little infantile paralysis for several decades.

Something as useful for polio fighting as the discovery of the relation between fluorine in drinking water and tooth decay might be turned up from such a systematic search.

This, in brief, is the advice given the world's polio fighters by Dr. Albert B. Sabin, University of Cincinnati, at the opening of the First International Poliomyelitis Conference in New York.

Infantile paralysis, as it used to be called, is becoming "less and less infantile in many parts of the world," Dr. Sabin found in one of the most complete international surveys of the disease.

In 1916, 3.7% of polio victims in cities in the United States were over 15 years of age. Today, 25% are over 15. More than half (53%) of cases in Copenhagen in 1944 were over 15.

The theories that improved sanitation and resistance acquired through unnoticed exposure to the disease explain the change in age at which it is attacking are pretty well debunked by Dr. Sabin's analysis. So he suggests looking for more subtle factors in the environment.

The total amount of polio has probably not increased in the past 30 years in cities in the northern part of the world, Dr. Sabin said. The attack rates for the entire United States show no sign of a progressive increase from 1915 to 1939. And although there seems to have been more polio each year since 1940, the attack rate each year would not be higher than in the 1915-1919 and 1930-1939 periods if only paralytic cases were included. Probably 40% of the cases reported each year since 1940 are not paralytic, Dr. Sabin said.

Even without taking this into account, there is no sign whatever that the total amount of polio in New York City has been increasing in the past 30 years. In fact, if the reports are reduced by 40%, to make

Malaya and typhoid fever patients in the United States. Recalling the long periods before penicillin and streptomycin became available, Dr. Smadel considers the promise of a fall supply a remarkable achievement.

International goodwill note: Dr. Smadel stressed the excellent cooperation from not only British scientists at the Institute for Medical Research, Kuala Lumpur, but also that from the Malayan government. The government, he reported, returned to his unit the 70 cents per gallon gasoline tax on all gas the unit's two jeeps used, besides giving other assistance.

Science News Letter, July 17, 1948

AERONAUTICS

Interchangeable Hulls Tested on Flying Boat

➤ INTERCHANGEABLE test hulls on a light-weight Naval amphibian plane are undergoing extensive flight and landing operations to determine which is best, particularly for use in rough water.

The tests are being made with a Navy Grumman J4F Widgeon, which has been modified so that the lower part of the hull on which it floats can be removed and replaced easily with other hulls of special designs by the use of bolts.

Present plans call for the testing of three different hulls which have been constructed as a result of research findings by the Stevens Institute of Technology, Hoboken, N. J., the National Advisory Committee for Aeronautics, Langley Field, Va., and the Glenn L. Martin Company of Baltimore.

The first hull to undergo rigid testing will be the elongated type now on the new Navy Martin XP5M-1, a patrol plane. The most striking feature of this is the length of its so-called afterbody. By extension of the hull bottom to the extreme end of the plane, a much longer base is provided which seems to lessen pitching and bouncing in rough water, protects the tail surface from waves, reduces the normal time and distance for takeoff, and makes landings less hazardous.

The hull being used on the Widgeon is a scaled-down reproduction of this Martin afterbody type. The second and third hulls to be tested will be the planing-tail type, designed by the National Advisory Committee for Aeronautics.

The plane for use with the various hulls has already been dubbed the "Petulant Porpoise."

Science News Letter, July 17, 1948

NUCLEAR PHYSICS

Superbomb Is Possible

Known basic reactions point to the possibility of a "hydrogen bomb" hundreds of times more violent than the present atomic bomb.

By WATSON DAVIS

➤ AN ATOMIC SUPERBOMB, a thousand times as violent as the present plutonium bombs, is definitely within the realm of possibility.

It would be made principally from the double-weight variety of the lightest chemical element, hydrogen. This isotope was discovered in America in 1931 and is called heavy hydrogen or deuterium (symbol D).

This is the "hydrogen bomb" that certain high officials in past months have vaguely, and possibly inadvisably, hinted may be made.

What, if anything, is being done by the U. S. Atomic Energy Commission about the construction of a deuterium superbomb is so far a secret, but the factual and theoretical basis of the hope for a new and more powerful bomb is no secret to anyone who can read the literature of physics and chemistry, even that earlier than 1940.

Basic Reactions

The basic reactions that point out the possibility of the superbomb are these: When two hearts or nuclei of heavy hydrogen (deuterons) come together there may be formed an ordinary hydrogen atom and a hydrogen atom of mass three (called tritium). Or the same coming together of D and D may also form a helium atom of mass three and a neutron. The important thing is that in each of these cases a sizable quantity of nuclear energy, due to conversion of mass into energy, is released. This amounts to 3,300,000 electron volts in each reaction.

You can find these reactions set forth in scientific articles published in 1935 in the *Proceedings of the Royal Society of London* and in *die Naturwissenschaften* (Germany).

The atomic energy released may appear at first sight to be small compared with that provided by the fission of the uranium or plutonium atom (which happens in the existing atomic bomb) which is 200,000,000 electron volts. But due to the fact that deuterium weighs only two, compared with uranium's 235, the energy available is very closely the same on a weight basis.

How to get the chain reaction started and kept going is a problem. In one sense it could be simpler for the heavy hydrogen bomb than the uranium-plutonium bomb. Neutrons, the neutral particles which are fundamental building blocks of atoms, are necessary to trigger and continue the fission of uranium or plutonium. No specially produced particles of this sort are necessary in the case of the superbomb. It is a matter

of getting two deuterons together with enough speed and punch. The problems of doing this have not been worked out, so far as the literature shows.

Certainly the superbomb will require very careful attention to producing a high level of agitation of the atoms and a very speedy transfer of the energy and agitation to other atoms. It must all happen in a fraction of a microsecond. How big the bomb can be is also a question. The suggestion that it can be a thousand times or so the violence of the present fission bombs is based on the idea that it has no limits of size beyond which it must explode. There is a critical mass of the fission bomb beyond which it will explode and below which it won't. The superbomb size limitation is probably the amount of material that will react in the short time.

Since the energy-releasing reactions of deuterium bombardment were known long before the discovery of the fission of uranium in 1939, it is assumed that scientists must have thought of making deuterium bombs long before the uranium bombs were conceived. But the invention of the fission bombs may have solved the problem of getting a deuterium bomb started.

The trigger of a deuterium bomb might very well be the explosion of a fission bomb.

Combined Bomb

Because in one of the two D-D reactions a neutron is produced, it may prove practical to make a sort of combined deuterium-plutonium bomb, using the neutrons of the D-D reactions to fission plutonium.

For this reason, any competent chemist could tell you that the material of the superbomb might be a solid consisting of a chemical combination of plutonium and deuterium.

One dream of scientists has been the operation here on earth of the cycle of nuclear changes that maintains the heat of the sun. Dr. H. Bethe, now of Cornell and one of the world-renowned atomic physicists, has advanced a theory, now generally accepted, that carbon transforms into helium by six steps through nitrogen and oxygen with release of nuclear energy. Presumably this takes place only at very high temperatures and pressures. But this subatomic process of the sun which has been talked about freely (see Smyth report) is quite different from the D-D reaction and should not be confused with it. Dr. Bethe did publish in 1938 a study of the nuclear energy within the deuteron (*Physi-*

cal Review), which bears on the superbomb.

Scientific journals show that there is a continuing intense research upon the effects of deuterium bombarded with deuterium. For instance in the *Physical Review* for April 15, 1948, Dr. E. J. Konopinski of Indiana University and Dr. E. Teller of the University of Chicago go into the theory of angular distribution of the products of smacking deuterons into deuterons. Both are closely identified with U. S. atomic research.

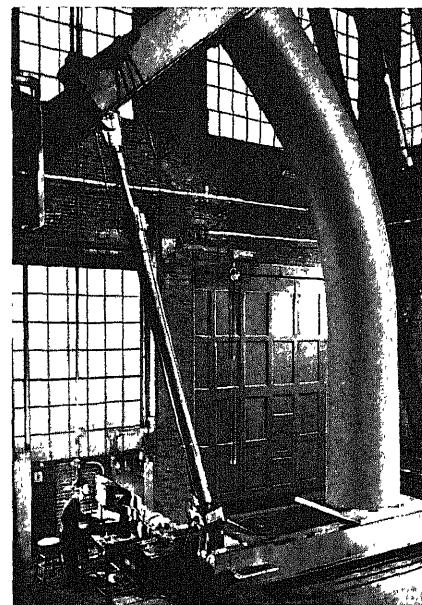
The discoverer of the neutron, Dr. J. Chadwick of Britain's Cambridge University, headed a team studying deuterium in 1937, while groups at Massachusetts Institute of Technology, Rice Institute, State University of Iowa and elsewhere in the U. S. A. published reports in the years 1935 to 1940.

Many Uncertainties

Besides the prime question of whether the superbomb will act as expected, there are other uncertainties: Will the scientists cooperate in fashioning a new and more dangerous superweapon? Will enough money and facilities be devoted to the problem by the government? Will some other nation get the superbomb first?

There may be only a few scientists in the world capable of working out the theory and practice of the superbomb.

Even if more powerful bombs are not



PIPE BENDING MACHINE—Here is shown a 50-inch diameter pipe bend which is the largest one-piece bend ever made. The apparatus, developed at the Jersey City Works of The M. W. Kellogg Co., will mean longer life, reduced maintenance and superior performance for piping systems of process units.

Am. Inst. Chem. Eng.

needed, research should continue on nuclear energy from deuterium. Power plants of the future might be run on this atomic fuel. The production of a continuing (chain)

reaction that won't explode should be as possible with heavy hydrogen as with uranium. And there is probably more heavy hydrogen than uranium on earth.

Science News Letter, July 17, 1948

NUCLEAR PHYSICS

Control of Atomic Bomb

If it is taken from the hands of civilians and given to the military it will create great uneasiness here and abroad. It will be an important political issue.

► A PRIME political question in this year of politics is:

Who shall control the atomic bomb, civilians or military?

The peace of the world may depend upon its answer.

The decision to put the bomb securely in the hands of the U. S. Atomic Energy Commission, composed of civilians, seemed to have been made by the passage of the McMahon Act two years ago.

But by providing only two-year terms for the atomic energy commissioners, Congress has served notice of the possibility of changes to come.

There is a quiet drive underway to put the military service back into the driver's seat on atomic energy. Latest manifestation is a plan sponsored by the McGraw-Hill Publishing Co. through its \$15-per-year monthly magazine, *Nucleonics*. This divorces military activities and production from the AEC, and actually leaves only research in the hands of the AEC.

If atomic bombs were ordinary weapons it might not be very important just where the U. S. A. stock is kept and who controls it. But atomic bombs are extraordinary, devastating weapons. They are unlike machine guns, ordinary bombs or 16-inch guns. One can wipe out a city.

The rest of the world is afraid of Amer-

ica's atomic bombs. There is a measure of reassurance in the fact that the armed forces of the U. S. cannot use atomic bombs until they are turned over to them by the AEC on presidential order.

No angry general or admiral can order an atomic bomb dropped on his own authority, as he might order a border guard to fire upon attackers. The dropping of an atomic bomb would be the equivalent of a declaration of war and that is the job of Congress on the recommendation of the President.

There is still high fear on the part of many that, given the bombs and a more aggravated international situation, some high military officials may be tempted to start a preventive war. Some have openly urged this.

As it is now close cooperation of the military services with the Atomic Energy Commission provides for development and testing of atomic weapons, as was done at Eniwetok.

The loyalty investigations of AEC employees (as well as all government employees) with attention being paid to the most insubstantial gossip of "guilt by association" have done great damage to the quality of the scientists at work on the atomic energy program. The scientists themselves say that our second or third

team is in the atomic energy game today.

Peaceful use of atomic energy has developed much more slowly than most scientists and laymen had hoped it would. Not even pilot plants for atomic power are underway, so far as known. This is added discouragement.

If the atomic bombs themselves are turned over to the men in uniform, it will be a new and ominous danger signal of a new war. This will be the case even if it should be done, secretly or openly, by Presidential order, without new legislation or change in atomic energy control.

Science News Letter, July 17, 1948

Losses of vitamin C value occur in plants that grow too much to foliage.

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GENERAL SCIENCE

Science Enters Olympics

Remote-control gun, sand leveler and an improved photo-finish camera are among the new scientific instruments which will insure a higher degree of accuracy.

➤ WHEN the athletes of 59 nations line up at Wembley Stadium in London on July 29 for the opening shot of the fourteenth Olympiad, science will be at the trigger of the starter's gun.

This year's Olympic track and field events will be the most scientifically conducted athletic meet ever held. Right down to the construction of the pole vault standards and the leveling of the sand in the broad jump pit scientific ideas have been brought into play to insure the highest degree of accuracy in timing and measurement.

The starting guns will be operated by remote control. In the usual start with a gun in the hand of the starting official, the man on the inside of the 400 meter race, for example, would have heard the shot more than one-tenth of a second before the man on the outside lane. Because this race starts on the curve of the track and is run in lanes, the outside and inside runners are nearly 150 feet apart. The use of remote control firing will make it possible to site the gun equidistant from all runners, while the starter will be free to take up his normal position where he will most easily be able to see all the competitors.

Even the photo-finish movie cameras of the 1932 and 1936 Olympiads are now obsolete and have been superseded by more modern equipment. The improved camera to be used at Wembley will, by an ingenious movement of the film, produce within 90 seconds of the finish of the race a print showing the exact order of the runners as they pass the post. It also will give the exact time between runners.

The judges will have an almost instantaneous photographic record which they can examine right in their stand. In the event of a disputed finish they won't have to go trotting off to a projection room to see a film run off, as was necessary with the old cameras.

In the pole vault, newly designed standards of aluminum will be fitted with pulley and hoist to haul the cross bar back into place. No longer will judges have to perform tricky and precarious feats of balance to replace the bar. The bar, too, is of aluminum and is claimed to be completely non-sag. The standards are fixed with a pointer and a sliding scale registering in meters and feet. They are placed so that officials can read all heights while standing on the ground.

Bumpy sandpits, that old bogey of the broad jump and the hop, step and jump, have been scientifically eliminated. This year the rough judgment of the eye will

no longer be relied upon to check that the entire surface of the sand in the pit is in the exact same horizontal plane as the top of the take-off board. A mechanical leveler, consisting of a metal scraper which slides on rails, will dish up a surface on which not one grain of sand will be out of place.

Scientific precision will also be observed in the measurement of jumps. The sand used will be moulding sand as used in iron and steel foundries. This will take a firm, clean-cut impression of the jumper's heel. Then a hinged frame, sliding on a metal runway fixed on a concrete base at the side of the jumping pit, will carry a hair-line which can be lowered exactly over the back edge of the heel imprint. As a final precaution, a special no-jump indicator will show if the jumper steps over the take-off board—like the "TILT" indicator on a pinball machine.

In the throwing events, too, the judges' task has been considerably lightened and the degree of accuracy of measurement greatly increased by a bit of scientific application. Measurements for the hammer, shot and discus will no longer have to be carried back to the throwing circle. Accurately placed pegs will describe a series of parallel arcs at suitable distances from the circle. Over the pegs will fit a special arc-shaped framework and it will be from this framework arc that the distance is measured. In this way only a very short distance will have to be measured, making for greater accuracy. A special device will insure that the steel tape measure is at right angles to a tangent drawn on the datum line arc so that the shortest distance between arc and throw mark is measured.

Here are some of the other applications of science to the Olympic games:

An electric timing device will be used in the rowing events.

A new type of starting block will be individually adjustable to the taste of each runner.

Standards and bar of the high jump will be of weatherproof, non-warp, non-sag aluminum.

Hurdles have been redesigned of tubular aluminum. They will fold flat for storage and, in use, will be adjustable to 2 feet 6 inches, 3 feet, and 3 feet 6 inches, as may be called for by the event. They will be accurately weighted to meet the prescribed eight pounds "toppling force" requirement at each height.

The Olympic Committee of the XIVth Olympiad is using science to make the Olympics a more accurate meet.

Science News Letter, July 17, 1948



STRESSES AND STRAINS—These are revealed by use of plastic counterparts in operating machinery which can be examined under polarized light.

ENGINEERING

Plastic Affords Inside View of Deformities

➤ INSIDE views of stresses and strains in operating machinery are made possible by the temporary use of plastic counterparts long enough to make interior records for later study.

The deformities are examined at leisure by use of polarized light, and they appear as a series of colored lines. Not any plastic may be used. The satisfactory kind is a new type developed by Westinghouse research engineers. It can be molded and cut into exact models of tools and machine parts, and it can be cast into chunks from ten to 20 times larger than any resin available formerly for such strength tests.

Stresses in a rotary shaft, nuts and bolts, crane hooks and other parts can be studied. To determine where a crane hook should be strongest, an exact model of the hook is made in the plastic. This is heated to about the boiling point of water, and any block of the desired weight is hung on it. The hook, with the weight on it, is then allowed to cool to room temperature.

By this process the distortions due to the load are "frozen" in the translucent plastic hook.

Science News Letter, July 17, 1948

Meteors, often called falling or shooting stars, are pieces of stone or iron that enter the atmosphere and burn, heated by the friction of the air; they travel some 60 miles a second, the glow becoming visible about 60 miles above the earth.

PHYSICS

Advance Theory of Matter

➤ MATHEMATICAL gymnastics of a 30-year-old Harvard physicist, who drew murmurs of appreciation and awe from an audience of leading scientists, may help explain the nature and structure of matter.

Dr. Julian Schwinger of Harvard performed the mathematical feats at a session of the American Physical Society meeting at the California Institute of Technology. He said that his new method helps weed out deviations in present theory. Still unsolved, he emphasized, is the comprehensive answer to many problems of physics which will require a unified "field" theory explaining both waves and particles.

Twin horns of the modern dilemma in physics are two theories upon which scientists have for many years based their concepts of electrons and electromagnetic waves. One theory, named after the modern English physicist, Dr. P. A. M. Dirac, satisfactorily explained the behavior of electrons as charged particles, or fixed points. The other theory by the nineteenth century British physicist, Clerk Maxwell, explained the behavior of electromagnetic waves of all kinds, including such waves as light and radio. The theories are valid singly, and satisfactorily account for two separate physical phenomena. Scientists used one set of

rules to explain the behavior of electrons as particles, and another to explain waves.

When the electron as a charged particle is placed in an electromagnetic field, however, the Dirac theory of the electron as a fixed point breaks down. Until very recently, this inadequacy remained a bridge with no necessity of being crossed. Recent experiments by Dr. I. I. Rabi of Columbia University, under whom Dr. Schwinger once studied, and others, however, blew the bridge sky high. Employing new and improved methods of studying electron dynamics, Dr. Rabi, a Nobel prize winner, showed the deficiencies in the theory so that they could no longer be ignored.

With extremely precise measurements he specifically pinpointed the deviations in Dirac's theory and pointed up the whole problem.

With an appreciable body of scientific knowledge hanging in the balance, Dr. Schwinger came to the rescue with a mathematical method of accounting for the deviations. By slightly modifying the Dirac theory, he salvaged a workable portion of the original idea and effected a compromise if not a wedding between Rabi's new findings and the old theory.

Science News Letter, July 17, 1948

ENGINEERING

Unmined Coal Yields Gas

➤ A SECOND experiment is underway in Gorgas, Ala., following that of last summer, to produce combustible gases by burning unmined coal deep underground as it lies in its natural seams. A contract to carry out the work has been made by the U. S. Bureau of Mines and the Alabama Power Company, the team that carried out the first experiment a year ago.

Basically, the plan followed consists of drilling from the surface down through the layer of coal. Fire is started by dropping an incendiary bomb down a hole. Air, under considerable pressure, is forced down the same hole to feed the fire and to force the combustible gases formed by the burning through the coal layer to one or more of the other drillings. The gases arising to the surface are captured and piped to storage tanks. They can be used to fire a boiler or used to make synthetic liquid fuels.

The experiment last summer showed that gases produced by burning unmined coal offer a potential source of fuel for power and raw materials for synthetic liquid fuels. If the plan proves commercially feasible, much coal can be utilized that is in layers too thin for economical mining. The gas obtained is a cheap source of carbon monoxide and hydrogen, the number one problem in making the manufacture of synthetic liquid fuels economical.

Last year's experiment showed that the underground combustion can be maintained and controlled, that coal in place can be gasified completely, and that the roof rock settles behind the burning face without cutting off the air or gas. But the gas obtained was of lower heating value than desired, probably because of leakages of gas and air pressure through cracks and breaks in the 30-foot layer of earth over the burning coal.

This year a 40-inch seam approximately 100 feet below the surface is to be used. Higher air pressure and higher temperature will be employed. Oxygen and steam can improve the gas quality further, as was proven last year.

Science News Letter, July 17, 1948

ENGINEERING

Flood Control in Mines Studied by Government

➤ FLOOD-CONTROL measures, an underground type little known but important in mining, are again to be studied this year in the anthracite coal region by the U. S. Bureau of Mines. A federal appropriation of nearly \$300,000 is now available.

Mine-water problems of the hard coal

fields are of long standing but are growing worse. The average anthracite mine now pumps out about 13 tons of water for every ton of coal removed. Twenty-five years ago the ratio of water pumped to anthracite extracted was eight to one. The bureau has conducted scientific and technologic investigations to assist operators in solving this water problem since 1944.

Billions of tons of anthracite are inundated by underground water pools in the anthracite region. These pools must be emptied before mines can be worked. Even those in worked-out mines are a hazard to neighboring excavations. The so-called barrier pillars left unmined along property lines or lines of adjacent mining operations may be a hazard. They operate normally as dams to prevent water in one mine from suddenly breaking into another, with subsequent loss of life or property. Proper pillars are a part of the study of the Bureau.

Present investigations are concerned with means for reducing the infiltration of surface and other water into the mines as well as with barrier pillars, pumping methods and the proper disposal of the pumped water so that it will not seep back into the same or into other mines. One of the factors retarding flood-control projects embracing the entire anthracite region is an estimated \$100,000,000 cost.

Eleven counties in eastern and northeastern Pennsylvania produce 95% of the anthracite in the United States. Approximately 80% of the production is consumed in the New England States, New York, New Jersey, Maryland and the District of Columbia. Some 40,000,000 persons are now dependent on hard coal for residential heating. About 1,250,000 persons depend, directly or indirectly, upon the anthracite industry for a living.

Science News Letter, July 17, 1948

ENGINEERING

Steam Blast Melts TNT Out of Its Steel Shell

➤ STATESMEN may be a bit slow about beating swords into plowshares, but a civilian employee of the Army, Cedric A. Hoskin of Succasunna, N. J., has devised an improved method for getting TNT, PETN or other high explosive charges out of shells, for possible use as blasting powder.

It consists simply of a grid of steam pipes, each one with a row of discharge-vents over which the opened shells are set. The steam blast melts out the high explosive, which trickles into a sloping-bottomed tank below, kept full of cold water. The trickling, tar-like explosive forms into firm pellets, which are raked out through an opening at the lowest part of the bottom, dried, and prepared for other uses. The empty shells, of course, are high-grade steel scrap.

Rights in the patent, No. 2,444,045, have been assigned royalty-free to the government.

Science News Letter, July 17, 1948

CHEMISTRY-TECHNOLOGY

Code Chemicals for Index

By this method more than a dozen bits of information are put on a simple notched card. Promises to speed research by allowing exploration of related compounds.

➤ A NEW and simple tool for recording and finding information about simple or complex chemicals and their properties has been developed by Calvin N. Mooers of the Zator Co., Boston, Mass.

Already in use by one large pharmaceutical research laboratory for keeping track of its organic chemistry experimental work, the new application of the Zator method of indexing information promises to speed research by allowing exploration of related compounds that might be overlooked by the usual laborious complicated filing.

The use of complicated chemical names in indexing is abandoned. Simple codes are used for the essential parts of the structural formulae of the chemicals. The new method actually puts more than a dozen pieces of information on a simple notched card. Mechanically sorted according to the random pattern notches, it is easy to pick out any desired combinations of chemical or other properties.

When more widely used, this Chemical Zatocoding, as it is called, promises to bring to attention compounds for medical or other use that would otherwise be overlooked. It will now be possible to search for unexpected combinations of chemical structure and properties that research shows are desirable.

Untangling complex patent claims is another application of the new method.

Each factor in the chemical structure is described on the card in a complete and direct fashion. The number of rings is noted. The size of the molecule is specified. The structure is described point by point. The elements are listed according to their place in the compound. If the structural formula is incomplete, the portion so far known is coded. The system for doing this and translating the information into code notches to allow selection is so simple that it can be learned in a half hour. Information other than chemical structure, such as color, physical properties, biological action, patent data or uses can be put on the same card.

"When used in chemical-biological screening," Mr. Mooers explained, "the new finding method should result in accelerating the discovery of useful properties of chemicals. Such screening has in the past resulted in new anti-malarial drugs, ANTU, the rat-killing chemical, and BAL, the antidote for mercury poisoning."

Correlation between the spectrum lines of a compound and its chemical structure should also be facilitated by the Zator method.

A sorter of uncomplicated design is used to select the combinations of information desired. Out of a thousand cards, for instance, it was possible in one use in five minutes to select the ten compounds containing an amine attached to some aliphatic group.

Science News Letter, July 17, 1948

PHYSIOLOGY

Threshold for Sweating Determined by Tests

➤ WHEN the temperature gets up to 93.9 degrees Fahrenheit, with relative humidity at 50%, a normal person will start sweating even when resting quietly in bed.

This threshold level for sweating, all too familiar these hot days and nights, was determined in scientific measurements reported by Dr. G. E. Burch, of Tulane University School of Medicine and Charity Hospital in New Orleans, in the *Proceed-*

ings of the Society for Experimental Biology and Medicine (April).

With exercise and increased heat production sweating starts at a lower temperature.

With a low relative humidity, the air temperature had to be higher before sweating started in the 11 men, women and teen-age children studied. With relative humidity at 40%, sweating started at 96.8 degrees Fahrenheit. With a relative humidity as low as nine per cent, sweating started at 102.2 degrees Fahrenheit.

In one patient sweating went in cycles. It alternately occurred and stopped at 15-minute intervals, even though conditions in the room remained the same. Apparently sweating cooled the man enough to abolish the need for this natural cooling mechanism for a certain length of time.

"He accumulated heat, sweated again, cooled his body, and then stopped sweating," Dr. Burch explains.

This cyclic sweating conserves water and electrolytes, such as salt, that are lost from the body in sweat.

The studies were made in an air-conditioned room. The rate of water lost from the forearm and the skin over the stomach was measured.

When the studies were prolonged, the people became restless and irritable and "nervous" or "psychogenic" sweating resulted. This made it impossible to observe the sweating due to the temperature.

Science News Letter, July 17, 1948



CHEMICAL ZATOCODING—Simple codes are used for complicated chemical names for indexing purposes which, by means of mechanical sorting according to the random pattern notches, afford an easy method of picking out any desired combinations of chemical or other properties.

MEDICINE

New Antibiotic May Aid Fight on Athlete's Foot

➤ **DISCOVERY** of a new antibiotic drug, like penicillin and streptomycin, which might prove a remedy for fungus infections from athlete's foot to more serious diseases involving lungs, brain and nervous system, is reported in the *Proceedings of the Society for Experimental Biology and Medicine* (April).

The new drug, called Bacillomycin, was discovered at the Wyeth Institute of Applied Biochemistry in Philadelphia by Drs. M. Landy, now at the Army Medical Department Research and Graduate School, and G. H. Warren, S. B. Rosenman and L. G. Colio.

Bacillomycin comes from a strain of the organism, *Bacillus subtilis*, which has already yielded such antibiotic drugs as subtilin, bacitracin, bacillin and eumycin.

Unlike penicillin and most other antibiotic drugs, Bacillomycin has striking power against fungi and almost complete lack of action against bacteria.

Practically all the important fungi that affect the skin, technically called dermatophytes, and those that cause systemic, or internal, disease are sensitive to Bacillomycin's action in the test tube experiments reported.

Science News Letter, July 17, 1948

CHEMISTRY

Low-Cost Barium Chloride Made by New Process

➤ A **LOW-COST** method of making barium chloride, an important chemical reagent widely used in industries, was revealed by the University Department of Chemical Technology in Bombay, India. The process uses as raw materials the mineral barytes, which is barium sulfate, and magnesium chloride, perhaps the cheapest source of chlorine.

The method involves the roasting of barytes with wood charcoal, powdering the resulting mass, and heating the pulverized material with a 46% to 47% magnesium chloride solution at less than the boiling point of water. The low-cost barium chloride obtained is particularly suitable for the removal of sulfate impurities in brine, and many other possible commercial applications are being investigated.

Science News Letter, July 17, 1948

ENGINEERING

Hydraulic Jack System New Invention for Cars

➤ **GONE** are the days of the old-fashioned automobile jack, that you have to dig out of the junk in the bottom of the luggage space, and fuss around until you think it's under the axle, and then operate by elbow,

grease—only to have the darned thing slip out and let the wounded wheel down again with a "whoomsh." A new invention by Frank Sragal of Detroit promises to make it as obsolete as the hand crank on the nose of the Model T.

The basic idea is very simple. There are four hydraulic jacks permanently attached to the frame of the car, each near a wheel. All are connected to a master cylinder, which is operated by the conventional brake pedal. There is a selector mechanism, which the operator turns to open the inlet valve to the jack which he wishes to function. Then he pumps away with his foot until the wheel is lifted free of the road.

When the spare has been put on, the operator shifts the indicator from inlet to outlet. Then a coil spring that is wrapped around the jack rod pulls it back up into its normal retracted position. To make sure that none of the jacks is inadvertently pushed down to the road while driving (which would of course mess things up pretty badly) the apparatus is locked in inoperative position, and can be released only with the ignition key.

Mr. Sragal has received U. S. patent 2,444,272 on his invention.

Science News Letter, July 17, 1948

ZOOLOGY

Whales Are in Danger Of Becoming Extinct

➤ **WHALES** are in danger of traveling the unreturning road to extinction, in spite of the respite which the war gave them from the harpoon guns of whalers, declares J. E. Hamilton, veteran student of the ways of the great sea-beasts, in the British journal *Nature* (June 12). Mr. Hamilton, after years of research on the Antarctic whaling grounds, now lives at Stanley, on the Falkland Islands, which may be regarded as in the nearer suburbs of the whales' domain.

Whale catches since the war have contained fewer pregnant females than formerly, he states, and individual measurements of the two principal species are shorter than they used to be. Moreover, giant individual whales are no longer being caught. All three of these phenomena are marks of a dwindling population, he points out.

Mr. Hamilton is strongly of the opinion that the lower size limit for permitted catches is too small. It should be revised upward, especially for females, if the animals are to be given a chance to reproduce. Also, the practice of reckoning the catch in "blue whale units," with one blue whale counted as the equivalent of two fin whales, two and one-half humpback whales or six sei whales, conceals dangerously large kills of the smaller-sized whales.

He warns that today's whaling industry, in its eagerness for the greatest possible profits, may be dooming itself to extinction along with the great animals that are its foundation.

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METALLURGY

Sample Molten Steel by "Eye-Dropper" Technique

See Front Cover

➤ **SAMPLES** of molten steel at 2,700 degrees Fahrenheit are taken from the pot at the General Electric laboratory by what might be dubbed eye-dropper technique. The sampling tube is a heat-resistant glass with a rubber squeeze-bulb on the end.

In the sampling process, the glass tube, which is about the size of a lead pencil and 18 inches long, is stuck into a ladle of the molten steel with the rubber bulb compressed. When the bulb is released, as shown on the cover of this week's *Science News Letter*, the liquid metal runs up into the tube just as water or a medicine is drawn up into the familiar eye-dropper. When the metal has hardened, the glass tube is cracked off.

In testing the steel, the sample rod from the glass tube is sawed in two pieces and the pieces used as electrodes of a high-voltage electric arc. The light from the steel electrodes varies with the make-up of the metal. By the use of prisms, trained observers are able to judge the quality of any batch of steel sampled with the eye-dropper.

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ASTRONOMY

Ancient Explosion Just Revealed to Astronomers

➤ **AN EXPLOSION** that occurred 4,000-5,000 years ago has just been discovered. At that time a terrific atomic outburst caused a distant star in the constellation of Cygnus, the swan, to blaze forth in a burst of glory.

The new supernova is of the fifteenth magnitude, 4,000 times fainter than the faintest star visible with the naked eye. If as close to us as our sun, it would shine with the brightness of 2,000,000 suns. But this star is so distant it takes 4,000,000 years for its light to reach us. That is why we are just learning of the explosion.

The object was found on a photograph taken by Dr. N. U. Mayall of the University of California's Lick Observatory, Mt. Hamilton, Calif. The supernova apparently reached maximum brightness several weeks ago, and is expected slowly to become fainter during the next few months. Located in a spiral nebula known as NGC 6946, it is near the border of Cygnus toward the constellation of Cepheus.

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E FIELDS

GEOGRAPHY

Cameras and Airplanes Are Photomapping Alaska

➤ A SUMMER-LONG aerial survey of 30,000 square miles of Alaska is now underway, the U. S. Navy revealed. Navy planes and Navy cameras are doing the job. It is being carried out in cooperation with the Department of the Interior and other government agencies.

Six Navy P2V Neptunes are being used.

Necessary modifications to fit them for this particular task were made at the Lockheed plant in California. The planes are based on the former Army airfield on Annette Island, near Ketchikan. The photographs are being taken from a height of approximately 20,000 feet.

Data secured from the photographs will be used to determine the waterpower possibilities of the panhandle region of Alaska, which stretches from Skagway to the south. They also will help estimate paper-pulp resources of the area. The survey will be of value to civil transportation by air because Alaska is on the Great Circle route from continental United States to points in Asia by way of the Aleutian islands. Alaska is also a valuable take-off point for planes to Europe by the North Polar route.

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PHYSIOLOGY

Jet Engine Noises Found Harmless to Shopmen

➤ WORKERS in jet-engine factories are unharmed by the high-pitched noises made by ordinary low-performance turbo-jets in tests carried out by U. S. Navy scientists. Final conclusions are not yet reached on the effects of very high frequency jet engine noises on the human body, but they may be harmful because ultra-high sound waves have already been proved harmful to mice and other animals.

The Navy conclusion is based on a 26-day test with 10 volunteers, including nine enlisted men and one medical officer, conducted at the Navy's Aero Medical Laboratory, Philadelphia. The engine used was a General Electric I-16 turbo-jet located in an open-end test cell.

The men were protected from audible noises by helmets, headphones, ear doughnuts or cotton ear plugs. They spent their time during the test periods in reading, drowsing or loafing.

The first report of the test appears in *All Hands* (July 11), a Navy publication. It states the study was undertaken because of ill-founded fears and rumors about the

harmful effects of turbo-jet engine noises to workmen in their vicinity. Jet engines are known to produce, at certain speeds, sound waves too high-pitched for the human ear to hear. They are somewhere between 20,000 and 500,000 double vibrations a second, the publication states. The upper limit of audible sounds for the human ear is about 20,000 double vibrations per second.

The general physical condition of the men did not change during the test, the Navy states. Neurological tests showed the nervous systems unchanged, and measurements of pulse, respiratory rate, temperature and blood pressure did not indicate the sound had caused any ill effects.

Five of the men undergoing the experiment lost weight, varying from about five to 19 pounds. All five felt abnormally tired or irritable. Of the other five, one felt abnormally nervous, and one more tired and irritable. The other three noted no physical or emotional change.

The general conclusion of the Navy scientists who conducted the tests is that, although ultra-high frequency does damage to some animal tissue, ill effects on human tissues appear unlikely unless the frequency is extremely high.

Science News Letter, July 17, 1948

GENERAL SCIENCE

M.I.T. Receives Estate for Teaching and Research

➤ ROUND HILL, the large estate of the late Colonel E. H. R. Green at Dartmouth, Mass., has been presented to the Massachusetts Institute of Technology by Mrs. Matthew Astor Wilks of New York, the present owner of the estate.

"While it is too early to make any specific plans, the estate offers exceptional possibilities as a center for technical education in various fields as well as for research," Dr. Karl T. Compton, president of the Institute, said.

The estate, with its stone mansion and numerous other buildings, occupies a plot of 277 acres on Buzzard's Bay, eight miles south of New Bedford. It includes a large farm with a farmhouse, barns and other buildings, several residences, and a radio station. At one time the estate had its own private airfield.

In 1925, when Colonel Green was living at Round Hill, he placed the estate at the disposal of the Massachusetts Institute of Technology for various research projects, and for the ensuing ten years the Institute's staff made important advances in radio communication, the navigation of aircraft, high voltage research, and meteorology.

From 1925 until his death in the spring of 1936, Colonel Green not only made his estate available to the Institute for research, but in addition gave it substantial financial support which resulted in notable contributions to the nation's welfare and to science in general.

Science News Letter, July 17, 1948

CHEMISTRY

Hard Water Softened by One of Polyphosphates

➤ HARD WATER is softened by dissolving glassy sodium phosphate in it. This keeps the calcium and magnesium in the water from combining with soap, the American Chemical Society was told at its meeting in Syracuse, N. Y., by Dr. Everett P. Partridge, Hall Laboratories, Pittsburgh.

This chemical is one of the group known as polyphosphates which are produced in large quantities and widely used in many industrial processes, including tanning sole leather and dyeing textiles.

Polyphosphates are used also in controlling the properties of mud used in drilling oil wells, improving the coating of paper for use in picture magazines, and conditioning water so that it will not form scale in boilers. The paste of titanium oxide and water used in paints will flow like milk if a small amount of this sodium phosphate is added.

Chemists are unable to explain the action of the glassy sodium phosphate in softening water, he stated. Some ordinary water softeners work by converting the soluble calcium and magnesium salts in the water into insoluble particles which settle on the bottom of the container. With the glassy sodium phosphate the water remains clear and there are no settlings. This softening without precipitation chemists call sequestration.

Science News Letter, July 17, 1948

ARCHAEOLOGY

Find Carving in Mexico Believed 20,000 Years Old

➤ WERE there native American artists in Mexico 20,000 years ago, at the same time that Cro-Magnon masters were frescoing the walls of caves in France and Spain, and carving images of ivory and reindeer horn?

First bit of evidence that such may have been the case was laid before the Archaeological Society of New Mexico by Dr. Hellmut de Terra of the Viking Fund, in the shape of a miniature sculpture which he found at Totolizingo in the Valley of Mexico. The find was made in the sand of what had once been a lake beach in the last centuries of the Pleistocene ice age. The geologic date is set by fossils of extinct species of horse, elephant and deer dug up at the same level. Further evidence of human occupation of this beach was indicated by three small bone points found by Dr. de Terra.

This small carving, the discoverer pointed out, apparently indicates the existence of a prehistoric race on this continent with an age at least double the 10,000 years estimated for Tepexpan Man, who since his discovery in February, 1947, has been considered America's oldest inhabitant.

Science News Letter, July 17, 1948

MEDICINE

Blood Wards Off Disease

Blood's gamma globulin protects children from diseases such as jaundice, mumps, measles and other serious infections that strike the young.

By JANE STAFFORD

➤ MEASLES, mumps, scarlet fever, jaundice. When you were a youngster you probably had all of those ailments, with whooping cough, chickenpox and German measles thrown in for good measure. Chances are you were pretty sick with most of them, too. Many of those diseases kept you in bed for days and days. You felt burning up with fever, your back and legs ached, your throat was sore. Then, when you began to feel a little better, the pain of an ear-ache woke you in the middle of the night and wouldn't let you sleep again.

Today's youngsters are luckier. They can escape whooping cough entirely, by protective "shots" given them when they are babies. If jaundice breaks out at school or camp, all but the first young victims can be given shots to protect against that, too. And if they do get some of the diseases you had as a child, they will not be so sick.

Big Measles Year

Take measles, for example. This has been a big measles year. More than 500,000 cases have been reported since the season started. But many of these children got off lightly. They were sick a day or two, instead of a week or more. They had only a slight rash, very little fever. Not one in 100,000 died. More important, they escaped the serious complications that used often to follow measles in the past, such as pneumonia, ear infections that sometimes led to permanent deafness, kidney and heart damage that crippled the victim for life.

What made the difference? Some of it was due to sulfa drugs and penicillin that could be used to stop quickly the complicating infections that made measles so dangerous. A big part of the difference was due to a new kind of protective "shot" doctors now give to children four or five days after exposure to a case of measles at school or at home.

The anti-measles "shot" is a substance called a gamma globulin. It came from blood, the good red blood you gave to the Red Cross during the war to help

save our wounded men overseas. American civilians were generous with their blood during the war. They gave over 13,000,000 pints of it. The wounded got all they needed. And there was even some left over after the war. The surplus was in the form of plasma, the fluid part of the blood from which the solids had been removed.

This plasma part of the blood contains, among other valuable substances, the antibodies formed in the body to fight off invading disease germs. Since at least 85 out of every 100 Americans have had measles by the age of 20 the blood collected during the war had plenty of measles-fighting antibodies in it. Measles antibodies not only help fight off the measles germs during an attack, they also make the body immune to further attack by measles. That is why you do not get more than one attack of measles.

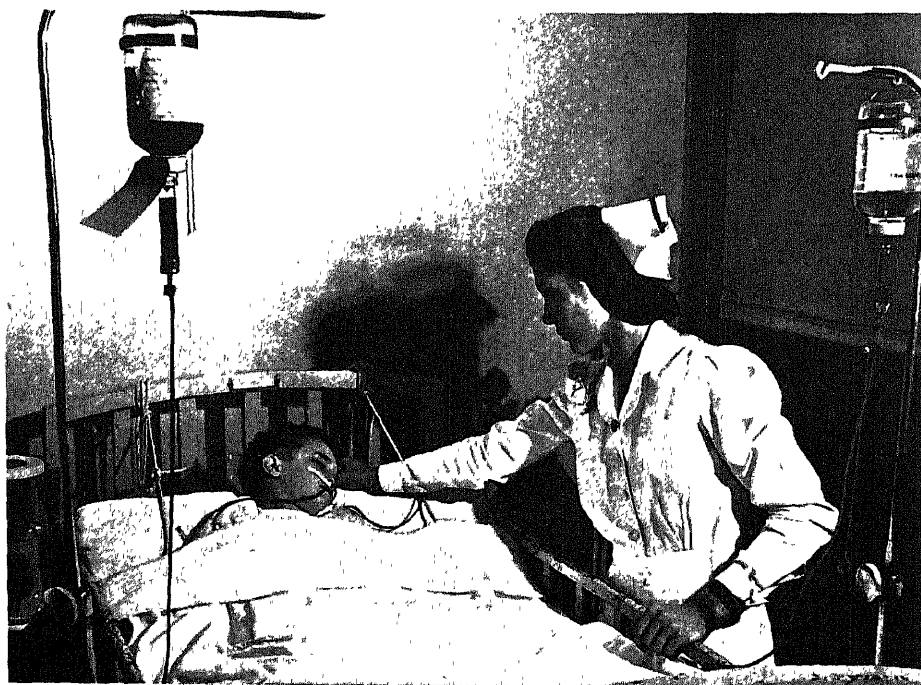
During the early part of the war, in fact by 1942, Dr. Edwin J. Cohn and associates at Harvard Medical School had

found a way of getting the globulin that contained the measles antibodies out of blood plasma in a concentrated form.

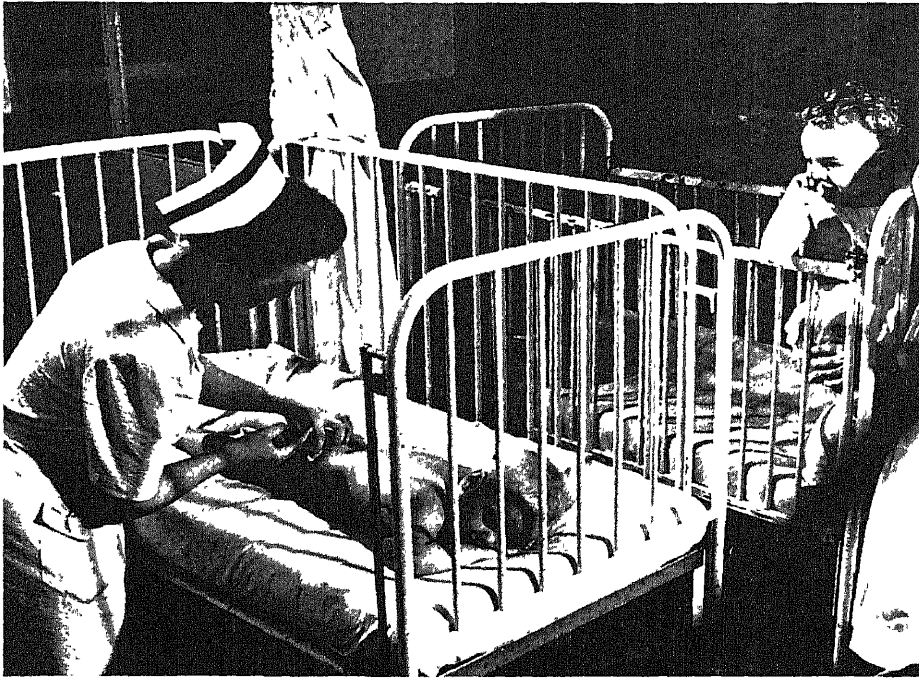
It was a by-product of the process by which serum albumin was separated from the plasma. This serum albumin was used, as soon as it was available, instead of plasma for transfusion to wounded and shocked men. It was just as effective as plasma and saved much space in shipping. At first the gamma globulin for fighting off measles was also reserved for the armed forces. The Army and Navy, recalling World War I experience, had expected measles epidemics in the training camps among young recruits from rural areas. If any such had developed, gamma globulin could have been used to check the epidemics and protect other young recruits who had not had measles.

Gamma Globulin

By 1944, however, there was enough gamma globulin on hand for the Red Cross to start distributing it through health departments to doctors, clinics and hospitals. It went back, free of charge, to the people who had given the raw material, blood, from which it was made.



SPEEDING RECOVERY—After a serious operation, blood from a Red Cross center is helping this child pull through.



PROTECTIVE SHOTS FROM BLOOD—Immune serum globulin is injected into a youngster in the children's ward of a hospital where an epidemic of measles threatens. In most cases, this will induce only a light attack and help give immunity.

Since 1944, more than 700,000 doses have been furnished by the Red Cross to help fight this childhood plague.

Most children are given what doctors call a "modifying" dose. The object is to let the healthy youngsters get a light attack of measles, but not escape it altogether. In this way they get a chance to build up in their own blood the antibodies that will protect them against measles throughout the rest of their lives. The antibodies in the gamma globulin from another person's blood protect only for about three weeks, instead of for life.

Anti-Measles Dose

Sick children and sick grown-ups who have never had measles, however, get a bigger dose of gamma globulin if they are exposed to measles. They get one big enough to ward off an attack completely.

But measles was probably not the only "catching" disease you had as a child. Like most other grown-ups, you probably had quite a few of the others. And, as in the case of measles, your body built up antibodies to the germs of these other diseases, too. The antibodies are found in the same gamma globulin part of the blood plasma. So it may be possible to protect children against other diseases besides measles by doses of gamma globulin.

Jaundice from the disease doctors call

infectious hepatitis is one example. This proved to be a serious problem during the war. Actually, scientists have since found that they were dealing with two kinds of liver inflammation, or hepatitis, both causing the yellowed skin condition known as jaundice. One kind comes in epidemics, and apparently is spread through contaminated water. Against this kind, gamma globulin gives protection. When the disease broke out in one institution for children, only two out of 100 got jaundice after they had been given gamma globulin, whereas 23 out of 100 got jaundice in the group not given the globulin. Unfortunately, gamma globulin does not protect against the other kind of hepatitis and jaundice.

Antibodies to infantile paralysis, to the streptococcus that causes scarlet fever and other serious diseases, and to mumps are also found in gamma globulin of blood.

Blood's gamma globulin may even in the future be able to save babies from coming into the world blinded from cataracts, deaf, with damaged hearts and feeble minds. Many such congenital defects, doctors now know, are due to the baby's mother having been attacked by German measles during the early months of pregnancy. Some medical authorities have suggested that abortions be performed on expectant mothers, if they get

German measles, to prevent the birth of defective children. But other scientists are hoping they can use a gamma globulin to ward off the disease in the mother, and thus prevent damage to her unborn child.

For this and other possible healing uses of blood, much more research is needed. And to do the research, scientists must have a supply of blood. At present, there is only enough gamma globulin on hand to take care of measles for another year.

We have the blood. It is circulating in the bodies of living, healthy American men and women. We gave over 13,000,000 pints of it during the war. Now we are asked to give some of our blood in the peacetime fight against disease and accidental death. Many are already giving to local blood banks. But these banks alone cannot supply the 3,000,000 to 4,000,000 pints medical authorities estimate are needed each year.

Nation-Wide Need

The blood need is nation-wide. The job of getting it must be done on a nation-wide basis, medical and health authorities decided. So they asked the Red Cross to take over. That agency has now set up a National Blood Program. Regional blood centers are being set up as rapidly as possible all over the country. Bloodmobiles will operate out of these centers, going into the small towns and country villages to collect blood, and

Handicraft Instruction Book

Full step by step instructions on all crafts including: Batik, Basketry, Beadwork, Block Printing, Cane Seating, Carving, Clay Craft, Coping Saw Work, Coin Craft, Etching, Fabric Decoration, Felt Projects, Hammock Making, Jewelry, Knotting and Braiding, Leathercraft, Metalcraft, Ruffiawork, Rush Seating, Stenciling, Stuffed Dolls, Toy Making, Weaving, \$1.50 per copy postpaid, 72 pp. At local dealer or write



Educational Materials
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Do You Know?

Tobacco requires more care in harvesting than almost any other field crop.

Wheat straw, millions of tons of which are wasted each year, is now increasingly used for blending with wood pulp to make paper and also to make building-board.

During the summer of 1947 nearly 50 different kinds of *prehistoric animals* were discovered in scientific diggings in New Mexico; they range from an extinct species of snails to the ancestral diminutive four-toed horse called *Eohippus*.

A new *wire* for wiring buildings is about two-thirds the size of the ordinary kind used but is coated with natural rubber over which is a synthetic rubber and then a hard shell of nylon; it resists gasoline, oil, fire, moisture, acids and light.

Five-sixths of *Maine*, over 16,000,000 acres, is wooded.

Aluminum can be used safely in the presence of sulfur because unattacked by it.

When two plants of different lines are crossed with one another, the resulting *hybrid* is often more vigorous than either parent.

returning it after processing to the doctors and hospitals of the region.

At the regional centers, the blood will be typed, tested and treated with preservative. After 21 days, when it can no longer be used as whole blood for transfusions, it will be separated into plasma and red cells. Some of these materials will be kept in the centers for distribution as needed. Some will be sent to pharmaceutical houses for processing into serum albumin, gamma globulin, for measles, thrombin and fibrin foam for surgeons to use in stopping bleeding, and anti-hemophilic globulin. Some will be sent to medical research centers, for investigation of possible further healing uses.

All the blood and all the products made from it will be supplied free to hospitals and physicians for the people who need it.

The Red Cross will pay the expenses of collecting, processing and distributing. The cost to patient or family will be for the physician's or hospital's services in making the transfusion or the injection of gamma globulin or administering one of the other products.

Science News Letter, July 17, 1948

ORDNANCE

"Alloy X" for Gun Bores

➤ "ALLOY X," a war-born metal for lining gun bores to prolong their firing life, has properties "so remarkable as to justify concealing even the basic metal from which it was evolved," it is disclosed in a new book, *Rockets, Guns and Targets* (Little, Brown and Company), edited by John Burchard of the Massachusetts Institute of Technology. The book as a whole is an account of the strides made in many fields of ordnance research by workers of the Office of Scientific Research and Development during the war.

Although the account does not state what Alloy X is, it seems safe to infer that it is not a new kind of steel, for it was one of the materials tested for barrel liners when it was found that no improvement in steel itself could prevent rapid erosion and hence loss of accuracy and velocity under the high powder-pressures used in modern military firearms and the even higher ones anticipated for the future. Steel gun linings are weakened and destroyed in three ways during firing: through the melting of a surface film by the intense heat of the burning powder, through its chemical action under the heat and high pressure, and through the friction of the projectile as it passes through the bore. Erosion results are serious: the exceedingly costly 16-inch naval gun becomes

useless after about 200 rounds and has to be relined; near the other end of the size scale, the .50-caliber machine-gun barrel sometimes loses so much in accuracy after a few minutes of aerial combat that the plane is as good as unarmed.

Two methods of protecting gun-barrel steel are disclosed in the new book. One is the insertion of erosion-resistant liners, either for the full length of the barrel or at least near the powder-chamber, where erosion is worst. Stellite, a cobalt-chromium-tungsten alloy, has proved especially valuable for this purpose. The other method is a chromium plating on the whole surface of the bore. This plating is sometimes made a little thicker towards the muzzle. This imparted a slight choke, thereby giving the bullet some extra foot-seconds of muzzle velocity.

Other topics discussed at length in the book are the development of the many types of rockets used in the war, the recoilless 4.2-inch chemical mortar that was really a low-angle cannon, and the frangible bullet that made combat target practice more realistic yet perfectly safe.

Resistance to innovations by civilian "interlopers," and toe-dragging tactics by some of the "heavy brass" of the old-line Services comes in for some salty discussion in a chapter headed "Sand in the Gears."

Science News Letter, July 17, 1948

ENTOMOLOGY

Fight Snail with Beetles

➤ A BIG BLACK BEETLE with long legs and an insatiable carnivorous appetite may possibly become man's next ally in his unending fight against the pests that devour his crops and garden plants. Dr. F. H. Williams of the Pacific Science Board of the National Research Council transported a small collection of the insects from Africa to Hawaii where they will be put through critical tests in a triply screened laboratory, to see if they are adapted to Pacific island life.

If they pass the tests, and are approved for introduction by the administrative authorities, they will be sent on to Guam, Saipan and other islands in the Trust Territory under American Administration, and more will be brought from Africa to join them. The job for which they are being considered is attack on the six-inch-long giant African snail, which is chewing to shreds the cultivated plants and much of the wild vegetation of the islands.

This huge snail, *Achatina fulica* by name, was introduced into the islands during the period of Japanese occupation, as a food animal. Because the Japs liked it, the big mollusk was kept down to reasonable numbers. But the Japs are gone now, and

neither the natives nor the Americans care to eat it. With nothing to hold it in check, the snail is flourishing—at the expense of anything green that gets in its path.

To find something that would be willing to eat it, Dr. Williams went to its native home in Kenya, East Africa. There he found this black beetle, whose name is *Tefflus*, attacking the much bigger snail as a leopard might attack a cow. Since *Tefflus* is one of the most promising predators thus far found, a test lot was collected and prepared for the long journey to the Central Pacific via the United States.

Dr. Williams also carried with him a couple of hundred scold wasps, which have already passed their entrance exams as attackers against a beetle enemy of the coconut trees on the Palau islands. They destroy the undesirable beetles by laying their eggs on their larvae or grubs after stinging them into paralysis; the wasp larvae kill the infant beetles by feeding on their tissues.

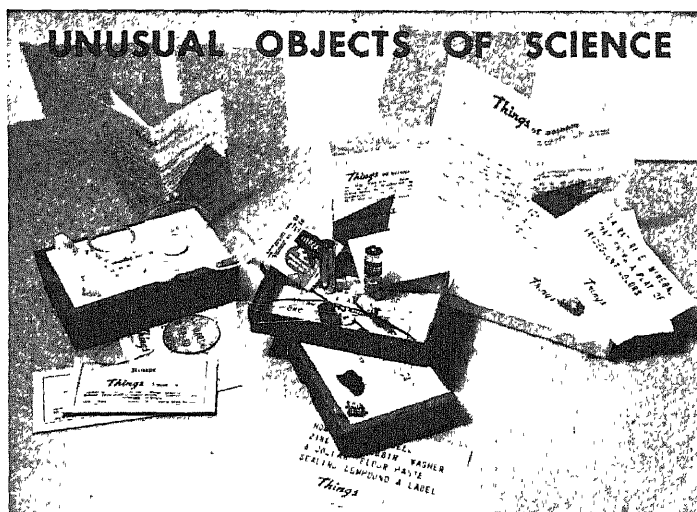
Funds for Dr. Williams' work were supplied by the Office of Naval Research, and the entire project has been carried out at the request of the Navy.

Science News Letter, July 17, 1948

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A mineral that makes you see double; a printed circuit; materials with which to assemble a dry cell—these are the exciting objects contained in the MINERAL OPTICS, ELECTRONIC and DRY CELL UNITS making up this collection. Among the 20 specimens contained in this group are a subminiature tube, light sensitive cell, iceland spar and labradorite. A factory-assembled dry cell and the materials needed to make one at home—zinc can, wrapped bobbin, bottom washer, top collar, sealing compound and label—are included along with a tiny flashlight bulb, litmus paper, wire, iron rod and filings with which to perform experiments.

B COLOR COLLECTION

Paints that glow in the dark; red and green plastic sheets that together cut out all light; brilliant dyes obtained from plant roots—these and many other intriguing specimens are contained in the PHOSPHORESCENCE, PLASTIC PILOT AIDS and VEGETABLE DYES UNITS which make this colorful collection. There are fourteen specimens in all, including blind flying sheeting in red and green, dimout blue sheeting, ultra violet transmitting sheeting, phosphorescence plastic, tape, pigment, paint, madder, indigo, tumeric and alum.

C MINERAL COLLECTION

Stones showing the original structure of trees that grew millions of years ago; vacuum tube insulator made from one of the softest known minerals; rock containing traces of native sulfur—these are the surprising subjects in the PETRIFIED WOOD, TALC and SULFUR UNITS making up this collection. In the three boxes there are seventeen specimens, including petrified sweetgum, redwood, oak, elm and bog, fired and natural talc, sulfur-bearing limestone, iron sulfide, zinc sulfide, crude sulfur and flowers of sulfur.

D UNUSUAL MATERIALS COLLECTION

Porous cushioning material for upholstery; glass-enclosed air cells used to keep out heat or cold; zinc made fine-grained by incorporation of only 0.05% lithium—these materials of industrial importance are contained in the HOUSING, HOME AND OFFICE and LITHIUM UNITS. The eighteen specimens contained in these three blue boxes include wood-fiber wallboard, plywood, glass fiber fabric, coffee measure, airfoam, plastic and wire screening, shaver head, natural spodumene, lithium chloride, lithium nitride, pure zinc, zinc and lithium master alloy, and lithium-treated zinc.

E FIBER COLLECTION

Synthetic fiber made from skim milk; twisted rayon cord used in auto tires; glass fibers less than three ten-thousandths of an inch in diameter—these are the interesting subjects of the CASEIN, RAYON and GLASS FIBER UNITS that will be sent to those selecting this collection. In the three boxes that make up this series of exhibits there are fifteen specimens, including casein powder, raw fiber spun from casein, aralac, soft glass fiber, cotton linters, chemical cotton pulp, rayon tire cord and rayon fabric lining material.

F PLASTIC COLLECTION

Film with a seam that is stronger than the plastic itself; plastic plate with which you can print a bit of illustration or writing; plastic-coated yarn for crocheting or braiding a design—these are the rewarding specimens contained in VINYL PLASTIC FILM, PLASTICS IN PRINTING and PLASTIC COATED YARN UNITS which comprise this unusual scientific collection. There are 20 specimens, including vinyl plastic film, heat sealed seam, spot welded ruffle, plating printing plate, moisture-proof sheeting, twist leaflet binding, plastic-coated yarn, flame-retardant webbing and fine fabric.

G TEXTILE COLLECTION

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THE AUTOBIOGRAPHY OF AN EX-COLOURED MAN:

The Vivid Story of a Negro Who Crossed the Colour Line—James Weldon Johnson—*New American Library*, 142 p., paper, 35 cents. Reprint of a book originally written anonymously and published by Knopf. The author was a Negro, but the book is not, actually, autobiographical; that being merely a device to call attention to the illogical character of race prejudice.

CANADIAN JOURNAL OF MATHEMATICS (Journal Canadien de Mathematiques), Vol. I, No. 1—H. S. M. Coxeter, Editor-in-Chief—*University of Toronto Press*, quarterly, \$6.00 per year or \$3.00 to members of certain mathematical associations.

DISTILLATION AND RECTIFICATION—Emil Kirschbaum—*Chemical Publishing Co.*, 426 p., illus., \$10.00. The first English edition of a book of interest especially to those in the distillation industry. Translated by M. Wolfinghoff.

EDUCATION IN HAITI—Mercer Cook—*Govt. Printing Office*, 90 p., illus., paper, 25 cents.

ENJOY YOUR CHILD—AGES 1, 2, AND 3—James L. Hymes, Jr.—*Public Affairs Committee*, 32 p., illus., 20 cents. Useful hints on how to do what is right for your young child and still have fun with him.

GENERAL ENDOCRINOLOGY—C. Donnell Turner—*Saunders*, 604 p., illus., \$6.75. A textbook presented as a fundamental aspect of biologic science rather than as a medical specialty.

HEATING, VENTILATING, AIR CONDITIONING GUIDE, 1948—*American Society of Heating and Ventilating Engineers*, 1280 p., illus., \$7.50. Containing technical and reference material, a manufacturers' catalog section, and a membership list of the Society.

INORGANIC PROCESS INDUSTRIES—Kenneth A. Kobe—*Macmillan*, 371 p., illus., \$6.00. A textbook containing basic information about these important chemical industries.

NEW HANDBOOK OF THE HEAVENS—Hubert J. Bernhard, Dorothy A. Bennett and Hugh S. Rice—*McGraw-Hill*, rev. ed., 360 p., illus., \$3.00. Written by and for people who enjoy the stars. The first edition from which this is re-written was the work of members of the Junior Astronomy Club.

NEW TELEVISION: The Magic Screen—Raymond F. Yates—*Didier*, 175 p., illus., \$2.75. A simple explanation for laymen of a complicated commonplace.

ORGANIZATION AND MANAGEMENT: Selected Papers—Chester I. Barnard—*Harvard University Press*, 244 p., \$4.00. The author, who is president of N. J. Bell Telephone Co., is also co-author of the State Department Report on International Control of Atomic Energy. He gives here his impressions of different kinds of private and public organization.

PARTICIPATION OF THE UNITED STATES GOVERNMENT IN INTERNATIONAL CONFERENCES, July 1, 1946-June 30, 1947—Department of State—*Govt. Printing Office*, 373 p., paper, 65 cents. International conferences attended by U. S. delegates will probably number 450 in 1948 as compared with an average of 75 annually before World War II. Those summarized in this volume include many on

science and related topics.

PROJECTIVE METHODS—Lawrence K. Frank—*Thomas*, 86 p., \$2.75. A lecture intended to direct the attention of students and others to the various methods for studying personality by permitting the individual to "read into" various neutral situations his own characteristic interpretations.

THE SONGS OF INSECTS: With Related Material on the Production, Detection, and Measure-

ENTOMOLOGY

Insects Menace Crops

➤ GRASSHOPPER HORDES are threatening crops in the northern Lake states and nearby prairie regions, reports from field entomologists to U. S. Department of Agriculture headquarters indicate. Wheat and the other small grains are largely out of harm's way, but corn and soybeans still have many weeks to go before they are "made," as have later cuttings of alfalfa and other hay crops.

Principal 'hopper concentrations are in Michigan, Illinois and Wisconsin, with the situation nearly as serious in Iowa and Minnesota, states W. A. Baker of the Bureau of Entomology and Plant Quarantine. Curiously enough, in the "chronic" grasshopper regions farther west and southwest the insects are not particularly troublesome, except for spotty outbreaks in South Dakota, Oklahoma and Arizona.

Severity of the grasshopper menace in the northern Midwest is believed to be due to the long drought of spring and early summer, which favored hatching and early survival. Rains in May and June, which usually beat a large proportion of the new-hatched 'hoppers into the ground, failed to materialize. At the same time, the drought checked the growth of wild vegetation on which grasshoppers normally do much of their feeding, and thus induced them to turn more towards cultivated plants.

Moderate to heavy rains over most of the threatened area within the past week or two found the grasshoppers too big to drown or pound into the ground. However, by encouraging the growth of wild vegetation they did some indirect good by diverting the insects' attention from the crops.

New counter-measures are receiving their first large-scale tryouts in the affected region. In place of the older sodium arsenite and sodium fluoride in bran-sawdust baits, two new organic chlorine compounds, Chlordane and chlorinated camphene or Toxaphene, are being sprayed or dusted directly on the vegetation. Another, benzene hexachloride, seems better adapted to use mixed with bait. Much still needs to be

ment of Sonic and Supersonic Vibrations—George W. Pierce—*Harvard University Press*, 329 p., illus., \$5.00. Those concerned with sound and supersonic signalling have a particular interest in the sounds of insects, many of which are outside the range of human hearing. Thus, this investigation from the physics laboratory at Harvard.

YELLOWSTONE—ITS UNDERWORLD: Geology and Historical Anecdotes of Our Oldest National Park—Clyde Max Bauer—*University of New Mexico Press*, 122 p., illus., \$2.00. A geologist of the National Park Service is author of this beautifully illustrated little book which gives informal answers to tourists and others who are curious as to what lies under the lovely scenery of Yellowstone.

Science News Letter, July 17, 1948

learned about all of these new weapons, however, Mr. Baker stated. Thus far their performance has been rather uneven; sometimes good, sometimes not so good. Factors still uninvestigated, like temperature or light, may affect the potency of the poisons in field use.

Chinch-bugs, usually grasshoppers' companions in evil-doing, have been quiescent so far, Mr. Baker reported. There have been some spotty outbreaks in Oklahoma and Missouri, but no mass activity. Benzene hexachloride and Chlordane have been used experimentally on the bugs where they could be found, but until real swarms of them appear somewhere it will not be possible to determine the anti-chinch-bug value of these new insecticides. The entomologists are waiting, and the first few billion chinch-bugs are likely to have a rough time of it.

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PSYCHOLOGY

Communism Is Poor Issue In Political Campaign

➤ COMMUNISM will not be an issue in the coming political campaign if the leading candidates follow the psychological advice of Robert C. Myers, visiting lecturer at Princeton University. Mr. Myers discussed political psychology as guest of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

It is not that the American people do not hate communism, but just that all are agreed in finding it very bad. It would not be plausible to tag an opponent as an agent of communism, or for each to claim that he is against it.

"It would be as silly," Mr. Myers said, "as if every candidate for office in the dairy state of Wisconsin should hang his campaign on the fact that he was distinguished because he hated oleomargarine—and hated it with a fervor greater than that of any of his opponents."

Psychologically, a political campaign is very much like the "thriller" melodramas of the old days, Mr. Myers indicated. The skillful campaigner finds out in advance what things his audience is most likely to hate and fear, and he casts these things in the role of the villain.

The villains may be high taxes, war, insufferable bureaucracy, communism, immorality, political corruption—or even civil liberties, Mr. Myers indicated. The political opponents are cleverly made to seem to personify these villains.

The candidate himself is, of course, the hero, the "knight in shining armor" who will save the voter from being ravaged by the villains and by their agents, dupes or accomplices.

That puts the voter in the role of the heroine.

"At this point the heroine—that is, the audience—should come in for a great deal of praise. Its worthwhileness and virtues should be painted in the brightest colors. Each member of the audience should be made to feel his extreme worth, and how horrible it would really be if any of the villains should actually win out, and how lucky he is to have a man before him who is ready to fight for him and save him from a fate worse than death."

But now the campaigner has worked himself into a bad position. For the beautiful heroine ordinarily does nothing to save herself. It is the hero who acts. How is he to get the voter to the polls?

"To bring this about calls for extremely fast footwork," Mr. Myers explains, "and our campaigner must skillfully and smoothly pull off what we may call a 'switch.' He must subtly and adroitly switch roles with the audience so that at election time, the audience members will be the heroes, and he the heroine who must be saved from his opponents by the votes which the audience members must cast."

Science News Letter, July 17, 1948

ZOOLOGY

Wolves Studied by Leading Soviet Zoologist

➤ WOLVES (the kind that howl, not the ones that whistle) are the special subjects of study of Prof. A. Kohts of the Darwin Museum, one of Russia's leading zoologists, according to word received indirectly from Moscow. He has had especially good opportunities to build up his collection lately, because of the increase of the wildlife population of the USSR, that followed the war's devastation.

The wolf species of northern Europe and Asia is identical with that of North America, Prof. Kohts declares. Differences are mainly in coat color. While North American wolves are gray, European wolves have a range of color from practically black in Spain to a sandy hue in the solitary wolves of the Arabian desert. Wolves of the cold Tibetan plateau, he adds, have woolly coats.

Science News Letter, July 17, 1948

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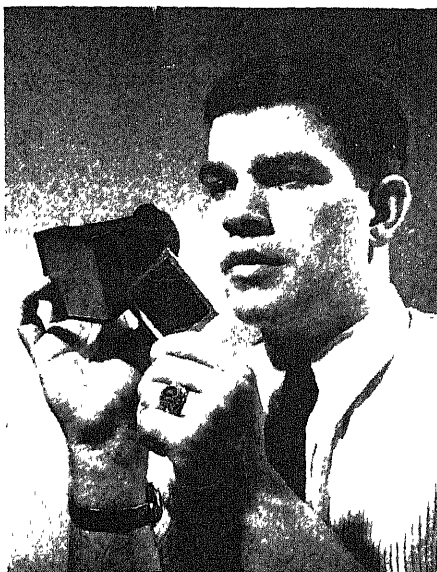
⚙️ **AUTOMATIC BRAKE LOCK**, which does not operate until the automobile has been brought to a full stop, holds the car even on a steep hill without the driver's foot on the brake pedal. It is designed for hydraulic shift transmission vehicles. Depression on the accelerator pedal releases the lock.

Science News Letter, July 17, 1948

⚙️ **MINIATURE GREENHOUSE** for the plant fancier or hobbyist is approximately eight feet square and about six feet high at the eaves. The factory-built, metallic-framed structure has upper sidewalls and roof of a transparent cellulose plastic reinforced by wire mesh.

Science News Letter, July 17, 1948

⚙️ **VIEWER OF** photographic films and transparencies is a light-weight plastic de-



vice, shown in the picture, with a ground glass back and an adjustable lens. Only the ordinary electric light bulb is needed for illumination; the viewer accommodates 2.25-inch-square transparencies and 35-mm. film in continuous lengths.

Science News Letter, July 17, 1948

⚙️ **INDIVIDUAL LOUD SPEAKER**, for use in drive-in or open-air theaters where it is attached to the window frame inside the car, has a pad of glass fiber packed inside its cast aluminum shell which contributes to the quality of sound reproduction by reducing echo. Each speaker has its own volume control.

Science News Letter, July 17, 1948

⚙️ **JARS, VIALS** and other containers, made of a special plastic, are particularly suitable for packaging wet, oily, acidic materials as well as dry products sensitive to moisture. The plastic used is lighter than glass, non-breakable, durable, odorless, tasteless, and highly resistant to strong acids, even to hydrofluoric acid.

Science News Letter, July 17, 1948

⚙️ **LAVATORY** unit for railroad cars, that requires only one square foot of space when recessed in the wall, combines a washbowl and a highly-efficient jet-flushing water closet. The washbowl is swung down into place for using by means of a finger latch, and the closet is controlled by a push button.

Science News Letter, July 17, 1948

• Nature Ramblings by Frank Thone •

➤ **RAGWEED**, the cause of most late-summer and autumn hayfever, is due to begin shedding its poisonous pollen soon. The resulting storm of sneezes will resound first in the North, about the end of the first week in August, all the way from Montana and Wyoming to Pennsylvania and New England. The wave rolls southward with the season, reaching the latitude of Tennessee and Oklahoma at mid-month, and the Gulf states about the first of September. The ill weeds will continue maturing and shedding pollen until frost kills them.

That is, they will unless you kill them first. Ever since the ragweeds were recognized as the villains they are, there have been efforts to eradicate them, at least in urban areas. But until very recently the only way to fight them was to pull them up by hand or mow them down with scythes, so anti-ragweed campaigns could as a practical thing be waged only when underemployment threw a surplus of cheap labor

Rough-on-Ragweeds



on the market. When people were busy and prosperous, ragweed prospered, too, and was busy in its own nefarious way.

Quantity production of the chemical weed-killer, 2,4-D, has made a revolutionary change in the method of fighting the ragweeds. Now, two men with a power sprayer can prevent more pollen than a score with

scythes. It isn't even necessary to kill the ragweed outright; a solution of less than lethal strength will still abort the pollen. Since both of the common ragweed species, the low and the giant, are annuals they will die when frost hits them, anyway.

Although 2,4-D spraying makes mass killing of ragweed easy, it does not entirely do away with the older hand methods of combating the pestiferous plants. If there are ragweed patches so close to shrubbery, flower beds or vegetable gardens that drifting spray might harm valuable plants, the safer thing is to stick to hand-pulling or scythe-swinging.

Nor should you expect to rid your community entirely of hayfever by clearing it of pollen-producing weeds. Ragweed pollen is dry and light, so that it will float in from rural fields and roadsides on even light breezes. Nevertheless, it is desirable to abate the nuisance as much as possible, for esthetic reasons as well as to diminish the discomfort of hayfever sufferers.

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JULY 24, 1948

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SCIENCE NEWS LETTER



®



Leaf-Cutter Bee

See Page 50

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MEDICINE

Check Polio-Induced Limp

By surgery it is now possible to slow down the rate of bone growth in the leg not shortened by polio in children. A chart on bone growth has been worked out.

► CHILDREN with polio-shortened legs can be saved from a lifetime of limping by a method announced at the First International Poliomyelitis Conference in New York.

The method consists in an exactly timed operation to shorten the longer leg. It was devised by Drs. William T. Green and Thomas Gucker III and Miss Margaret Anderson of the Children's Hospital of Boston.

A leg paralyzed in childhood commonly does not grow as rapidly as a normal leg. If only one leg is paralyzed, the child may when he is fully grown have one leg as much as four and a half inches shorter than the other.

To correct this difference, one or more of the growing ends of the bone in the longer leg is operated on so that it will grow at a slower rate. The object is to slow down the normal, longer leg to the point where the paralyzed, slower-growing leg can catch up with it in length by the time the child stops growing.

The big problem is to catch the growing end of the longer leg at exactly the right time. A guide for this, in the form of a chart of bone growth in 160 children, was worked out by the Boston scientists. The chart was made from measurements of X-ray pictures of the children who were observed continuously from periods of three to 11 years. The growth expectancy for the leg bones was determined for each age level from this chart. From this the scientists could predict the rate at which the longer leg would grow each year, and thus when to operate.

The child who shows signs of failure in growth and consequently has a more string bean physique may be more likely to get polio, it appears from growth studies by Drs. Neil N. Litman and James F. Bosma of the University of Minnesota.

They studied the physical progress of 216 school children who got polio during the 1946 Minnesota epidemic and compared these children's progress with that of 198 of their brothers and sisters and 607 of their classmates.

The physique and rate of growth of the brothers and sisters and classmates up to July, 1946, was close to the average for American school children. But, the scientists report, "there was a distinctly higher incidence of growth failure prior to this date in the children who contracted clinically-proven poliomyelitis in the 1946 epidemic.

"The results of this study," they conclude, "definitely show that growth failure

and susceptibility to clinical poliomyelitis are related phenomena."

Science News Letter, July 24, 1948

AERONAUTICS

Jet Planes for Civilians Predicted for 1951

► JET PLANES for civilian transportation, which will fly nearly seven miles above the surface of the earth carrying 30 passengers at 500 miles per hour, are predicted for 1951.

The prediction was made by Robert E. Hage, Boeing Airplane Company, at the meeting of the Institute of the Aeronautical Sciences at Los Angeles. By that time the commercial use of 30-passenger turbojet planes can be technically feasible and commercially profitable, he declared.

This type of transportation, he added, will offer to the commercial air passenger more speed, greater flight frequency, and more comfort at fares comparable to present standards. The goal of the airlines is increased speed, especially if at the same time improvements in safety, comfort, reliability and economy result.

Immediate development of a prototype turbojet transport will speed the development of turbojet powerplants, airport facilities, airline procedures, and the overall efficiency and growth of the American commercial air transport system. Furthermore, Mr. Hage said, a reserve of highly efficient transport aircraft will be available for military service in a future emergency.

Science News Letter, July 24, 1948

Pressurized Tanks Urged

► PRESSURIZED TANKS directly attached to jet engines were advocated at the same meeting to replace engine testing in either closed or open wind tunnels, by J. F. Manildi, University of California at Los Angeles. It is a less costly way and dodges serious problems that arise in tunnel testing.

In closed tunnels, he said, the problems of dissipation of heat generated within the engines and the interference due to tunnel walls are nearly insurmountable. In open tunnels the power required to insure a stream of sufficiently large cross-section is extremely large.

With pressurized tanks attached to the intake of the jet engine, the effect of both forward speed and altitude can be simulated. Installation costs and power require-

ments are much lower than for tunnel installation, and the evaluation of internal performance of the engine from the test data is vastly simplified.

Science News Letter, July 24, 1948

POPULATION

Small Cities Are Now Gaining in Importance

► SMALL CITIES and suburbs are increasing rapidly in size and importance and large cities are growing more slowly. Decentralization is slowly taking place in this country, with small cities as centers.

These changes have been taking place chiefly in the last 10 years, declares Prof. Donald J. Bogue of the Scripps Foundation for Research in Population Problems at Miami University.

City dwellers are gradually moving to the suburbs to escape congestion and high taxes, he finds.

At the same time, automobiles and electric power are making it possible for small communities outside the sphere of large cities to support a larger population than before. As a result, small cities are growing and developing their own tiny suburbs and farming regions.

While regions close to the big cities and those over 65 miles away have been growing faster than the big cities themselves, the zone which lies between 45 and 65 miles from the large cities has been hardly growing at all. Cities in this zone are too far from the metropolis to be suburbs and too near to avoid strong competition, Dr. Bogue points out. The next 10 years may see development of this region because of pre-fabricated housing, electric power and motor transport.

Science News Letter, July 24, 1948

ENTOMOLOGY

Leaf-Cutter Bee Makes Nest By Using Scissors and Paste

See Front Cover

► THE LEAF-CUTTER BEE, which looks like a small bumblebee, is often seen flying among rose bushes in search of tender leaves. The bee cuts leaf patches with its jaw shears, as shown on the cover of this week's SCIENCE NEWS LETTER, and carries them away for the construction of its nests. Favorite nooks for nests are holes in posts, and spaces under weather boarding. The bee constructs a nest by carefully fitting and pasting together leaf patches into a thimble-shaped container. Bee-bread, made from pollen, is first stored in the nest, and then an egg is laid on this lump of food. Finally the nest is sealed up with several additional patches. The bee uses oval patches for the sides, and round ones for the top and the bottom of the nest. The bee that hatches from the egg emerges by chewing a hole through the wall of leaves.

Science News Letter, July 24, 1948

ANATOMY

Find Vital Brain Centers

Discovery of the location of the centers controlling breathing and blood circulation may save the lives of patients stricken with bulbar polio.

► **DISCOVERY** of the two most vital centers of the brain controlling breathing and blood circulation was announced by Dr. A. B. Baker, University of Minnesota Medical School, at the First International Poliomyelitis Conference in New York.

They are bits of tissue each no bigger than a grape seed. They are located in the part of the brain called the medulla, or bulb, which connects the spinal cord with the brain. The bulb itself is only the size of a man's thumbnail, extending an inch and a half back into the brain.

The breathing and blood circulation centers are each really twins. That is, there is a left and a right breathing center and a left and a right circulation center. The twins of each set work together. Having two of each is a natural safety provision, like having two lungs and two kidneys. A person might get along with only one of the breathing center twins, but if both are destroyed by the polio virus or an injury, death follows.

Discovery of the exact location of these breathing and circulation centers was made during the infantile paralysis epidemic in Minnesota in 1946. Doctors had known before that injury to the bulb at the base of the brain might kill by stopping either the heart or breathing.

They knew this was the cause of death in polio when the virus invaded the bulb of the brain, in cases of bulbar polio. But when doctors at the University of Minnesota hospital saw 183 bulbar polio patients within three months, they were able for the first time to sort out the patients by symptoms.

Some, they saw, had trouble only with breathing. They had this trouble even though their breathing muscles in the chest were not paralyzed. Others had fast heart beat, and the blood pressure went way too high or way too low. Still others had trouble swallowing and talking. Obviously, different centers in the brain had been affected.

Actual location of the centers was made by examining 5,000 thinner-than-paper slices of the bulbs of brains of patients who died of bulbar polio. In every case of death from breathing trouble, the damage was in the same tiny area in the bulb. In every case of death from heart and circulation trouble, the damage was in another tiny area, but the same area in each of these circulation cases, too.

Polio patients stricken with bulbar polio this year, as many have been already in North Carolina, will have a better chance of survival, thanks to these discoveries. No

more than ten out of every hundred bulbar patients should die, Dr. Baker estimates. Most of these would be the ones whose blood circulation centers have been damaged by the virus. The ones with damage

CHEMISTRY

Halt Spread of Infection

► **DISCOVERY** of a blood chemical barometer of polio infection was announced by Drs. David Glick and Frank Gollan of the University of Minnesota Medical School at the First International Poliomyelitis Conference in New York.

The chemical is called anti-hyaluronidase. It acts to stop hyaluronidase, which is a spreading agent contained in bacteria, viruses, snake venom and bee sting venom. The spreading chemical, hyaluronidase, speeds the spread of infection through the

to the breathing centers can be kept alive in most cases by oxygen and other treatment during the acute stage.

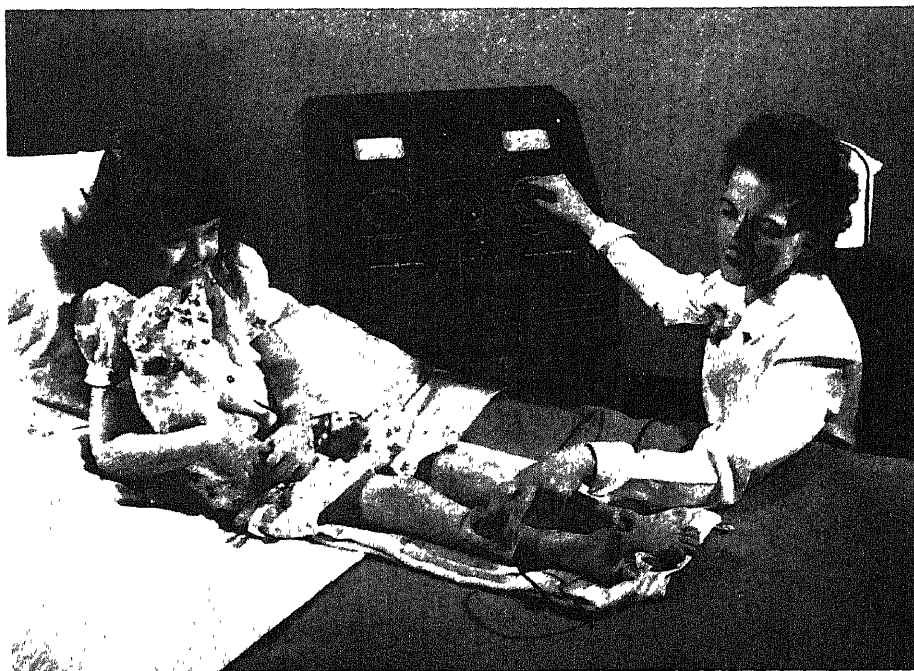
For the patients with damage to the circulation centers no treatment has yet been discovered. The next step by Dr. Baker and associates will be to attempt to produce exactly the same damage to exactly the same tiny spot in the brains of laboratory animals. Then they can try various treatments to find one that will save the victims. When this is accomplished it will be another step in the fight against infantile paralysis.

Science News Letter, July 24, 1948

body by dissolving the cement-like chemical that holds tissue cells together. In studies of animals and 27 human polio patients, the Minnesota scientists found the amount of the anti-spreading chemical increased in direct proportion to the infection.

The anti-spreading chemical, the scientists believe, might be used to determine the acuteness of infection in a polio case and to confirm the diagnosis in suspected cases.

They are trying now to isolate the anti-hyaluronidase so that it might be given to



MUSCLE-STIMULATING DEVICE—Paralyzed muscles of a little girl are artificially exercised by this new device called a variable frequency wave generator. Developed jointly by the General Electric Research Laboratory and the G-E X-Ray Corp., the machine uses electric current to contract and relax paralyzed muscles to prevent them from wasting away through disuse. It was demonstrated for the first time at the First International Polio Conference in New York.

Lindthorpe, L. J. and

Imperial Agricultural Products Corporation

patients to halt the spread of infection through their bodies. Attempts are also being made to find a drug or chemical that would stimulate the body to produce more

anti-hyaluronidase itself. Discovery of such a chemical might give a kind of vaccination method for protection against polio.

Science News Letter, July 24, 1948

PHYSIOLOGY

Gage Muscles by Sound

A new machine called an electromyograph, reveals the state of health of muscles by allowing the doctor to hear the sound they make when they contract.

➤ DOCTORS can now tell by the sound a muscle makes when it contracts whether it is paralyzed, getting better or normal.

If it clicks, the muscle is in bad shape. If it makes a deep-toned "glup-glup," it is healthy. Sounds in between the click and the glup tell when the nerve of a polio patient is regenerating and the muscle coming back to normal functioning.

The machine that lets the muscle tell its story in sound as well as on a silent screen was developed at Northwestern University's Department of Nervous and Mental Diseases. It was shown at the First International Poliomyelitis Conference in New York by Dr. L. J. Pollock, head of the department, and Dr. Alex J. Arieff.

Called an electromyograph, the machine is similar to the electrocardiograph which picks up electric potentials from the heart and the electroencephalograph which picks up potentials from the brain, popularly called brain waves.

Tiny needle electrodes are stuck into the muscle to be tested and the machine turned on. The doctor then can both see and hear what the muscle is doing as it contracts. In cases of paralyzed muscle, an electric stimulator to the nerve is used. This is just placed on the skin surface over the muscle being tested. The stimulator tells whether

the nerve fibers have come down to the muscle. The machine used without the stimulator tells whether the impulses are getting to the muscles.

The machine is being used for diagnosis in war veterans and other patients with peripheral nerve injuries as well as for polio victims.

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Muscle-Testing Machine

➤ A MACHINE that takes the guesswork out of muscle testing and gives a big boost to the polio patient's spirits with its record in pounds of his improvement was shown at the same meeting.

The machine was devised by Dr. Willis C. Beasley of the U. S. Public Health Service.

With this machine doctors and physical therapists can for the first time get an accurate measure, in pounds, of the strength of even the weakest muscles. Heretofore strength of weak muscles has been gaged by the examiner who reports muscles as being "poor," "fair," or "good." The reports are based on the examiner's estimates from experience with how much strength he must exert to counteract the force of the muscle being tested.

Now the examiner can make the test in

the same way, but a small gage strapped on the examiner's hand is connected by means of an electronic device with the machine that gives the measurement in pounds.

Muscles so weak they can exert pressure of only one-tenth of a pound can be tested as well as strong muscles capable of exerting 300 to 400 pounds of pressure.

Patients, especially children working to strengthen weakened muscles, are greatly encouraged by hearing reports given in figures rather than in vague terms. A child, Dr. Beasley explained, is stimulated to compete when he finds a muscle that rated six pounds has gone up to eight or ten. Whereas a difference from "poor" to "fair minus," for example, would not be so encouraging.

Science News Letter, July 24, 1948

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MEDICINE-TECHNOLOGY

Iron Lung Has Substitute

New electronic respirator, which may prove a boon to polio patients and poisoning victims, will get its first trial this summer.

➤ AN electronic substitute for an iron lung will get its first trials on polio patients this summer.

This new method of giving artificial respiration, which may also be used to save victims of barbiturate sleeping medicine poisoning and electric shock, was reported by Drs. James L. Whittenberger, Stanley J. Sarnoff and Miss Esther Hardenbergh, Harvard School of Public Health, at the First International Poliomyelitis Conference in New York.

First and only patient on whom the apparatus has been used so far was a woman with a "fast hiccup," technically termed diaphragmatic flutter. But the doctors do not know yet whether hiccup sufferers in general could be helped by the apparatus. It was tried on this patient because the surgeon was opening her chest anyway to cut the phrenic nerve to her diaphragm.

For polio patients and poisoning victims the doctor would make a small cut in the patient's neck and attach a silver electrode to the phrenic nerve at that point. The electrode leads to the electronic stimulator. As soon as this is turned on, the patient loses all desire to breathe and the machine takes over. The patient does not fight it as he often does the iron lung.

The electronic stimulator can be regulated so that slow, deep breathing with plentiful intake of air goes on automatically. The machine plus its batteries is small enough to be carried anywhere and can be used in an ambulance as well as in the hospital. Nursing care of polio patients will be much easier than when the patient is in an iron lung.

To make the electronic respirator more useful to poisoning and electric shock victims, the scientists hope to find a way of concentrating and focussing the current from the machine to the phrenic nerve so that it will not be necessary to make the cut in the neck and attach an electrode.

A new way of taking blood pressure which promises to help victims of "blue baby" and other heart and circulation defects has also been developed by Drs. Whittenberger and Sarnoff.

Instead of putting a cuff around your arm, doctors using this method will insert a small rubber tube into a vein in your arm and gently push it up into your heart and through the heart into the main artery leading to the lungs. As the doctor withdraws this tube the newly devised pressure-taking machine records the different blood pressures in the lung artery and the valves and auricles and ventricles of the heart.

Pressures in these different places may vary from two to 60. But the new machine shows the small ones just as clearly, accurately and quickly as the big ones. So the doctor can tell at once where and what kind of defect in blood circulation is present. Besides helping diagnose various ailments, the machine is expected to give entirely new knowledge of the blood vessels in the lungs.

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PLANT PHYSIOLOGY

Human Saliva Inhibits Germination of Seeds

➤ HUMAN SALIVA contains something that prevents some seeds from germinating and checks the growth of those that do sprout, experiments by Dr. Dvora Yardeni of the Hebrew University in Jerusalem have demonstrated. (*Science*, July 16).

Dr. Yardeni treated seed wheat with saliva collected from 33 persons of both

sexes and ranging in age from six to 68 years. Some of the treatments were at full strength, others with various dilutions.

Subsequent germination behavior showed a wide range in the inhibiting power of various samples, though there was no discernible correlation with either sex or age of the contributing individual. As a rule, undiluted saliva had greatest effect, but in a few cases greater inhibition of sprouting was obtained with a 50% dilution.

The inhibiting effect seemed to be principally on the radicle, or first small root; in many cases this failed to come out at all, though there were at least beginnings of shoot development.

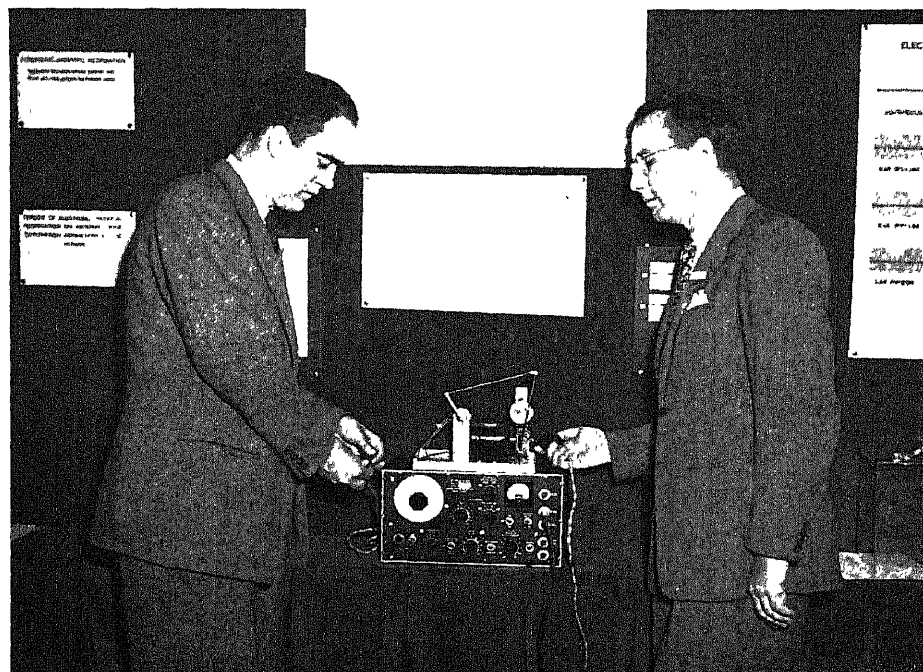
Dr. Yardeni was prompted to undertake the experiments by two different groups of observations made by other workers: (1) that human saliva has a bacteriostatic effect, like that of penicillin; (2) that various antibiotic chemicals have a germination-inhibiting effect on seeds.

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PHYSIOLOGY

Diet of Milk Causes Liver Damage in Rabbits

➤ CIRRHOSIS—gin-drinker's liver to you—can result from an exclusive diet of milk. Rabbits and guinea pigs have shown that nearly perfect food to be not quite perfect; it lacks something that protects the



ELECTRONIC RESPIRATOR—This experimental model, which may prove to be an iron lung substitute, is demonstrated by Drs. James W. Whittenberger and Stanley J. Sarnoff of Harvard. When produced for general use, it will be only about half this size and have fewer dials and knobs. Dr. Whittenberger at left is holding the silver electrode that is attached to the patient's phrenic nerve through a small cut in the neck.

liver against tissue breakdown and the degenerative fibrous and fatty growth that constitute cirrhosis, and also something that promotes normal growth.

This dietary deficiency in milk was discussed by Edward J. Thacker of the staff of the U. S. Plant, Soil and Nutrition Laboratory, before the seventh annual meeting in Ithaca, N. Y., of the Laboratory's collaborators who work in state experiment stations and various federal departments.

Mr. Thacker has been keeping rabbits and guinea pigs on diets consisting of whole milk and skim milk powders, plus neces-

sary mineral elements. The animals fail to grow normally, and when they are autopsied, their livers prove to be badly damaged. Substituting dehydrated alfalfa for one-half the diet will prevent the development of cirrhosis. Less than that much alfalfa will enable the animals to grow, but then they will develop liver damage. It thus appears likely that the liver-protecting factor is distinct from the growth factor, but the case is not definitely proven. Thus far, neither factor has been isolated or identified.

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MEDICINE

Two-Front Attack Needed

Medical detectives must discover how the virus is spread and polio detectives must find the means to stop this virus criminal.

► **MEDICAL DETECTIVE WORK** along two fronts is needed for the conquest of infantile paralysis. This is clear from final reports made to the First International Poliomyelitis Conference in New York.

Scientists, thousands strong, are waging a good fight but no one really knows just how many polio viruses exist or what are the characteristics of each of the different strains of the polio virus family.

Within another six months research now under way may bring dramatic proof that some one avenue of germs is the prime means of the spread of the virus from one person to another. Is this avenue of infection an aerial route which the virus rides on the feet of flies? Or does the virus invade the fly's body as it does man's and travel in de luxe style with the fly furnishing food as well as transportation? Answers are coming to these questions, with their hint of a way to stop the spread of polio as yellow fever was stopped by discovery of the mosquito's part in its spread.

But if the answers are "noes," the polio detectives on another front may find the clues to stopping the virus criminal. A method for vaccinating against polio which is on a sounder basis than ever before was reported by Dr. Isabel Morgan of the Johns Hopkins School of Hygiene. Put the vaccine into the muscles, not just under the skin, and give such a big dose that the virus-fighting antibodies spill over from the blood to the central nervous system where the polio virus concentrates. This method will protect monkeys. Will it protect man?

The answers must come partly from the medical detectives who ferret out the secrets of what happens in the human body during the first hours of polio invasion. They must come partly from the polio detectives who trail and identify and characterize the various strains of polio viruses. This part of polio detective work is not as exciting

as it sounds. Dr. John R. Paul of Yale Medical School, one of the foremost polio detectives, calls it "dull" and "uninspiring." But, he said, "if we are to attempt to prepare specific vaccines which might be used to immunize man against this disease, we must clarify the strain situation."

Ferretting out the feeding habits of polio viruses is still another job for the medical detectives. Following this line, Dr. Raymond N. Bieter of the University of Minnesota has discovered chemicals which prevented paralysis or death in 90 out of every 100 mice. The polio virus, Dr. Bieter knew, has a special liking for nerve cells. Maybe, he reasoned, this is because the virus is hungry for some chemical in nerve cells. And if the virus enters the body through the throat and stomach and then goes to the nerves, why not, he wondered, feed it nerve cell chemicals while it is still in the stomach and stop it where it does no damage to human bodies?

It worked in mice. There is a hint that it is working in monkeys. If this proves true, the next step will be to try it in humans. But if it does not work in monkeys, the next step will be to try other chemicals the virus may be hungry for. Dr. Bieter is already on the trail of some of these. When he finds the right one we may have a chemical cure or preventive of polio.

Science News Letter, July 24, 1948

METEOROLOGY

Air Travel Made Safer by Central Weather Service

► **A CENTRALIZED** weather information bureau, now in full operation in Denver, is making a heavy contribution to both safety and comfort in airplane transportation. It is maintained by United Air Lines and is

located at Stapleton Airfield base.

With the aid of a huge weather wall map, meteorologists of the company review each morning the past weather conditions over the coast-to-coast and Hawaiian routes of the airline, study the present conditions, and make forecasts for the next 24 hours.

Meteorologists at other stations are consulted by telephone, and constant contact is maintained with the Denver U. S. Weather Bureau, whose chief meteorologist prepares special forecasts for the company. Airline weather forecasters along the system are aided in keeping posted on the nation's weather, minute by minute, by the company's 15,000 miles of private teletype lines and 7,600 miles of private telephone circuits. In addition to the centralized service, they keep in touch with the U. S. Weather Bureau and such Army, Air Force or Navy weather stations that may be in the vicinity.

By means of this central information center and the reports received by it the possibilities of conflicting predictions are ruled out. The information permits flight operators to cope with unusual weather problems, by rerouting planes around bad-weather regions or grounding them, and mile-by-mile information radioed to pilots warns them to prepare for, or dodge, bad weather ahead.

Science News Letter, July 24, 1948

CHEMISTRY

Ammonium Nitrate Safe When Properly Handled

► **SAFETY** in handling ammonium nitrate, the widely-used, white crystalline chemical compound that was behind the recent Texas City disaster, receives indirect consideration in a circular of the U. S. Bureau of Mines. Eighteen fires, serious explosions, and disasters involving ammonium nitrate have occurred since 1896.

The principal wartime use of ammonium nitrate was in explosives. Today's principal use is for fertilizer. Long used in limited quantities for this purpose, its use at the present time has greatly expanded. It can be employed with safety if proper precautions are taken.

The publication was prepared by G. S. Scott and R. L. Grant, chemists of the Pittsburgh office of the Bureau of Mines. Copies may be obtained free from that office. It deals with accidents and disasters, manufacture, preparation as a fertilizer, physical properties of pure ammonium nitrate, decomposition and oxidizing properties, spontaneous heating, and detonation.

The report includes a brief summary of published scientific information on ammonium nitrate and an up-to-date bibliography for reference. The publication states that while chemically pure ammonium nitrate does not decompose spontaneously at ordinary temperatures, it is an oxidizing

agent and, as such, may react with reducing materials, such as carbonaceous matter, certain metals, phosphorus and sulfur. With certain mixtures and the proper environment, spontaneous heating can occur at ordinary temperatures.

Science News Letter, July 24, 1948

CHEMISTRY

Find Way to Keep Powders Suspended in Liquids

➤ ELECTRICAL CHARGES on their particles enable certain soapy chemicals called detergents to prevent the curdling of paint, cosmetics and other commercial preparations, the American Chemical Society was told by two California scientists, Leonard Greiner of the U. S. Naval Ordnance Station, Inyokern, and Prof. Robert D. Vold of the University of Southern California, Los Angeles.

Many present-day commercial products, including medicines and toiletries as well as paints, consist of finely divided particles dispersed in liquids. The list of such products would grow, they said, if the factors governing the stability and efficient preparation of dispersions were better known. The investigations on which they reported were to discover the unknown factors.

Powder can be suspended indefinitely in a liquid, they stated, if a suspending agent is added to the mixture. They explained that the agents seem to charge the particles with electricity so that they repel each other. The molecules of the soapy chemicals used split into electrically charged particles when dissolved in water.

Science News Letter, July 24, 1948

CHEMISTRY

AEC Selling Chemicals In Radioactive Forms

➤ LATEST peacetime service of the nation's atomic energy program is the sale of chemicals tagged with radioactive elements, announced by the U. S. Atomic Energy Commission.

These chemicals are compounds such as certain acids and alcohols in which one of the elements is radioactive. The radioactive forms, called isotopes, of some chemical elements have been sold to researchers by the Atomic Energy Commission for two years. But the new tagged chemicals will speed studies where the radioactive elements are to be used in compounds.

One of the more important isotopes for research on living things, carbon with atomic weight of 14, is listed by the Commission as available now in several different compounds with more scheduled for production. Radioactive gold in the form of colloidal gold and aurothiosulphate is available for therapeutic use, it was announced.

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EXPLODING STAR—Recently discovered supernova, of the fifteenth magnitude when found, is shown here. Located in a spiral nebula known as NGC 6946, the arrow points to it. The supernova, 4,000,000 light years from the earth, was discovered by Dr. N. U. Mayall of the University of California's Lick Observatory. It was taken with the Carnegie 20-inch astrograph. (See SNL, July 17).

AERONAUTICS

Elasticity of Plane Wings

➤ THE elasticity of an airplane wing profoundly affects the stability and control of aircraft, the Institute of the Aeronautical Sciences was told at a meeting in Los Angeles, by S. I. Pai and W. R. Sears of Cornell University.

Far from being rigid structures, wings and other components deflect elastically under load, they said. Thus air loads on a wing in flight actually distort the wing, the distortion changing the air loads. The important effects on the ordinary straight wings are due to twisting; with the newer sweepback or sweepforward wings a bending under load changes the air loads appreciably.

Inertia loads, such as weights carried near the tips of the wings, tend to bend the wings downward. This has a stabilizing effect. Fuel tanks on wing tips, already carried on some planes, appear to be advantageous for this reason.

Science News Letter, July 24, 1948

Boundary Layer Control

➤ BOUNDARY layer control through the use of suction slots in airplane wings was found not "particularly attractive by comparison with drags known to be obtainable

with wings of sufficient smoothness," according to H. B. Dickinson of Lockheed Aircraft Corporation. The use of these suction slots has been recommended by others.

Boundary layers are relatively thin layers of air next to the wings and fuselage of a plane that cause considerable drag. The suction slots on the rear half of the wing surface removes part of the layer and, in theory at least, reduces the drag which comes when the smooth, or laminar flow, breaks into a turbulent flow.

Between 1941 and 1946, an investigation was conducted at Lockheed to determine whether it was advisable to attempt an early application of boundary layer control to an airplane project. The investigation was confined to the use of a single spanwise suction slot on the upper surface of a low-drag airfoil of conventional thickness and planform, Mr. Dickinson stated.

After extensive tests it appears that before the slot method is adopted, the simpler method of obtaining sufficient smoothness of actual wings should be solved. Thereafter, drag reduction by boundary layer control appears less promising, he said, and to make the added complication worthwhile would require capitalizing on all potential advantages.

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CHEMISTRY

Police Force of 300 Men In Shirt-Shrinkage Test

► THE entire police force of Springfield, Mass., were, unbeknown to the public, experimental guinea pigs during the past year. They wore woolen shirts treated with a special chemical preparation to prevent shrinkage. Both police and shirts withstood the test.

A report on the shirts, and policeman reaction to them, was made recently by Police Chief Raymond P. Gallagher. He stated that after a year's wear the reaction of his entire force was most complimentary. The 900 shirts tested had been worn in all sorts of weather and subjected to all sorts of laundering both in commercial plants and home wash tubs. They should be good for another two years, he said.

This experiment was conducted by the Monsanto Chemical Company of St. Louis and Everett, Mass. The chemical used is known by the trade name of Resloom, and is a melamine resin preparation. Police were selected because of the nature of their duties. The only precaution given the men when the shirts were issued was not to boil them. Individual records made by the officers after each washing show only 33 noted any shrinkage, and these were marked as slight.

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VETERINARY MEDICINE

Penicillin Saves Turkeys With Swine Disease Germ

► PENICILLIN has been shown capable of saving turkeys infected with the same germ that causes swine erysipelas, in experiments by Dr. C. G. Grey of the U. S. Department of Agriculture.

He injected doses of 20,000 units of penicillin, suspended in peanut oil, into the wattles of a group of turkeys infected with the swine erysipelas germ, leaving a similarly infected group untreated as controls. All of the controls died, whereas the loss was only 10% in the treated group.

Dr. Grey chose the wattle as the site of the injection because it is not used for food. This is believed to be the first practical use ever found for this curious appendage on the turkey's head.

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PSYCHOLOGY

Guinea Pigs Trained to Go into Hypnotic Trances

► GUINEA PIGS can be trained to go into a prolonged hypnotic trance, reports Dr. W. T. Liberson, of the Research Laboratory, Institute of Living, in Hartford, Conn.

The training is very simple. It consists of putting the animal on his back. If he turns over, he is immediately put back on

his back and this is repeated as often as necessary for a two-hour "lesson" each day.

In the hypnotic state the animal lies with paws out, eyes popped out and rolled down and with a fine tremor. At first he may stay in this condition for about half a minute. But after a week of training he may be kept in the same state for two hours without interruption.

Some animals were able to retain their ability to go into a prolonged trance even after three months without further training.

This ability to keep laboratory animals in a prolonged hypnotic state is useful to experimenters on abnormal behavior. It has been difficult to use animals in such experiments previously because hypnotic states in the laboratory animals have previously been very brief and complicated.

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GENETICS

Formaldehyde Produces Mutations in Fruit Flies

► FORMALDEHYDE, familiar through its uses as disinfectant, preservative and embalming fluid, is able in low concentration to produce mutations, or sudden evolutionary changes, through its effects on the hereditary characters carried by the chromosomes within cell nuclei.

Experiments demonstrating this were carried out on fruit flies in the laboratories of the University of California, by William D. Kaplan, who reports his results in *Science* (July 9). Mr. Kaplan's results support and confirm earlier researches along the same line conducted in the USSR by a Russian investigator, I. A. Rapoport.

The mutations produced in both series of experiments were of the type known as lethal; that is, the individuals in which they occurred all failed to live.

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GENERAL SCIENCE

Proposed Measures Would Decrease Trade Barriers

► DECREASED barriers to international trade are expected from international standards for textiles and textile test methods proposed at Buxton, England, at a meeting of representatives of 13 nations. Countries included, besides those of western Europe, are Australia, New Zealand, India, the Soviet Union and the United States.

United States participation is through the American Standards Association. The American delegation was composed of 12 men representing the association, the National Bureau of Standards, and other organizations concerned with textile studies or manufacture. Important steps were taken to organize the standards, but further studies must be made by special committees. Americans will head two of these committees.

Science News Letter, July 24, 1948



ENGINEERING-AERONAUTICS

Floating Drydock to Hold Largest Flying Boats

► TESTING an experimental floating drydock for the Navy's largest flying boats has been completed in Port Hueneme, Calif., and the dock pronounced a success, it was revealed. The floating drydock is designed to permit repair work on giant seaplanes without hoisting them aboard seaplane tenders.

The drydock consists of four pontoon strings connected side by side, each 18 pontoons long, on which wingwalls are imposed, and has a timbered deck. It is equipped with three water jets on each wall to assist in warping the seaplane into place by throwing water pressure against the sides of its hull.

Under present plans, an LSD (Landing Ship, Dock) will serve as a tender for the floating drydock. This type of vessel was built to serve as a parent ship to landing craft and to coastal craft. It is large enough to receive in its well deck the drydock with cradled seaplane for maintenance. The drydock is 103 feet long and nearly 40 feet wide. The LSD will carry it from place to place where needed.

Science News Letter, July 24, 1948

NUCLEAR PHYSICS

Glasgow Is New Center of British Nuclear Research

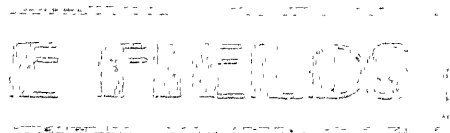
► WITH the British Government's decision to build a new 300,000,000-electron volt synchrotron at Glasgow University, Glasgow has become an important center of nuclear research in the British Empire.

Research has been going on there for some time using a 30,000,000-electron volt synchrotron which was built in 1946 and is the world's first machine of this kind. It has been used for industrial and medical research work, but scientists have been limited by the comparatively small scope of the machine.

The new 150-ton synchrotron is being constructed by Metropolitan Vickers in association with the Ministry of Supply's Atomic Energy Research Establishment and the University of Glasgow. The machine is to be used for fundamental research in nuclear physics and medical research in the field of X-rays.

Large-scale synchrotrons now being built in the United States include the 3,000,000,000-electron volt atom-smasher which the Brookhaven National Laboratory at Upton, Long Island, N. Y., expects to finish in three years.

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MARINE BIOLOGY

Color Photos of Life in Ocean To Be Attempted

► COLOR photographs of life in the ocean at two miles straight down will be attempted by this year's expedition of the research ship *Atlantis*, which left Woods Hole, Mass., July 15. Leader of the oceanographic group aboard is Dr. Maurice Ewing of Columbia University.

To produce light enough to make color pictures in the everlasting darkness of great ocean depths, powerful flashlamps will be used, with specially built transparent covers to protect them against the crushing pressure. Black-and-white pictures will be made at depths even greater than the two-mile limit set for the present on the color cameras.

Other research objectives include further mapping of the Midatlantic Ridge, the great submerged mountain chain that runs down almost the whole length of the Atlantic, the collection of 60-foot cores of its surface materials with a long sampling tube, and collection of bottom life with special deep-water trawls and dredges.

The expedition is sponsored jointly by Columbia University, the Woods Hole Oceanographic Institution and the National Geographic Society.

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PLANT PATHOLOGY

Elm Disease Outbreak In Denver Confirmed

► DUTCH ELM disease, deadliest enemy of the favorite American shade tree, is now known to exist far to the west of Ohio, long thought to be its western limit. Very recently an outbreak in Denver, reported by Colorado state entomologists, was investigated and confirmed as the true elm disease by workers of the U. S. Bureau of Entomology and Plant Quarantine. The destructive fungus has been attacking elms in several places in Ohio, and at least one spot outbreak in Indianapolis, Ind., is known to have occurred.

Entomologists in Washington are disturbed over their lack of information about possible outbreaks between the Ohio-Indiana area and the Rocky Mountains, for elms are valued shade trees throughout the Midwest. Lack of funds has forced them to curtail survey work formerly carried on in zones around the area of known infestation.

The fungus that causes the disease is carried by a bark-burrowing beetle that is known to be sensitive to DDT. Spraying with this insecticide therefore is recommended for the protection of trees suffi-

ciently valuable to justify the cost. Two sprayings are commonly applied: one before the leaves develop, to get the beetles as they attack the bark on the twigs; the other in July, which kills leaf-eating insects and caterpillars as well as any beetles that may be about at the time.

Dutch elm disease, incidentally, is a misnomer. It came to this country from Europe, but definitely not from the Netherlands.

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AERONAUTICS

Unconventional Flight Control System Abandoned

► A NEW, simplified but unconventional flight control system for British private planes has been abandoned because it is unacceptable to a number of light-plane pilots. Their principal objection appears to be that it does not employ the familiar normal method of stick and rudder pedals.

The system, already officially approved by the British Air Registration Board, was intended to be standard equipment on the Chrislea Super Ace light personal plane. The majority of the pilots who gave it a trial agreed that it was admirably suited for private flying, club flying and for planes carrying light loads, but they preferred the familiar type of controls.

The control in this new system was a single wheel, resembling a car's steering wheel mounted on a short column projecting from the instrument panel. With this system, the wheel is rotated in the direction of the required bank. For climbing or diving, the wheel is lowered or raised. To turn the plane's nose left or right, the wheel is swung left or right. A Chrislea test pilot pronounces the system as practical once the unusual movements become familiar.

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ENGINEERING

New Device Measures And Records Vibrations

► VIBRATIONS in a building or in a machine, too minor to be noted by ordinary means, are measured and recorded by a new device small enough to hold in the hand, General Electric revealed. It is called a recording vibrometer.

A short metal prod which projects from one side of loaf-of-bread-sized vibrometer is held against the vibrating object. Inside the instrument's case, a moving sapphire point rests on moving waxed-paper tape. Vibrations are transmitted through the prod, magnified 12 times by a spring, and passed on to the moving point, which records on the tape both frequency and magnitude of vibration.

The tape is moved forward by a constant speed motor. A time mark is made on the tape every three seconds.

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ENGINEERING-AERONAUTICS

British Airport Lighting Claimed as Major Advance

► A NEW TYPE of airfield approach lighting, claimed to be a considerable advance on any system previously devised anywhere in the world, is to be installed at London Airport this year. It is a system for use in foggy weather or at night which will give pilots a horizon at which to aim in landing.

The system consists of bars of lights placed horizontally across the approach area at intervals of 600 feet, with a central line of lights 100 feet apart leading straight to the runway. As the pilot approaches the runway, the bars of light provide him with an artificially created horizon by which he can gauge his distance from the ground. The central lights guide him to the runway.

It is expected that the use of this lighting system will permit daytime landings when visibility is restricted to 200 yards, and nighttime landings when visibility is down to 100 yards. The system was designed at the Royal Aircraft Establishment at Farnborough, where it has been installed experimentally at the airport.

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PLANT PHYSIOLOGY

"Pepping-Up" Methods Don't Add Vitamin C to Greens

► A "MESS O' GREENS" from a normally fertile, adequately watered garden will contain all the ascorbic acid, or vitamin C, it is capable of developing. Its content cannot be increased by forced feeding with fertilizers or any other "pepping-up" methods, it was indicated in experiments reported by Dr. G. Fred Somers of the U. S. Plant, Soil and Nutrition Laboratory at the seventh annual meeting of the Laboratory's collaborators in Ithaca, N. Y.

The tests were made by the most delicate and exact of plant physiological methods, with leaf samples of equal area cut from turnip and broccoli leaves of uniform size and age. These were subjected to various chemical and physical conditions and then analyzed for their ascorbic acid content.

Preliminary experiments showed that basic needs of leaf cells for forming the vitamin are the same as those for formation of carbohydrate food: sunlight, moisture, carbon dioxide and the right temperature. Given these, the leaf material doesn't seem to mind what else it gets.

Extra doses of fertilizer salt, of certain sugars, of hormones or growth control substances, even some poisons, either fail to speed up the vitamin production or actually depress it. The sole exception is potassium nitrate, which at some low concentrations increases production to a certain extent. Otherwise, the leaf samples get along best on plain water.

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ASTRONOMY

Meteors More Numerous

Perseid "shooting stars" will be seen at their best late on the night of Aug. 12 because the moon will set about midnight, having just passed first quarter.

By JAMES STOKLEY

➤ WHILE on any clear, dark night one may see a brilliant shooting star, or meteor, there are some times of year when these bits of cosmic dust that enter the earth's atmosphere from outer space are much more numerous. The early part of August is such a time, especially about the twelfth. But often the moon is then so bright that the meteors are overwhelmed in its glare. This year, however, the moon is new on Aug. 4 and is just past first quarter on the twelfth, which means that it sets about midnight. Since the meteors are most frequent in the early morning hours, the moon will be out of the way for those who want to observe them.

On the accompanying maps (which show the appearance of the skies about 11:00 p. m., daylight saving time, on Aug. 1, and an hour earlier the middle of the month) the constellation of Perseus is seen low in the northeast. This is the part of the sky from which the August meteors seem to emerge, and hence they are called the Perseid meteor shower. Late on the night of Aug. 12, these will come at about the rate of one a minute, but even earlier they will appear more often than usual.

Jupiter Brightest

The brightest planet to be seen these August evenings is Jupiter, now in the constellation of Ophiuchus, the serpent-bearer, near the bright and ruddy star Antares, which is in the neighboring constellation of Scorpius, the scorpion. In the south as the sun sets, Jupiter remains plainly visible throughout the evening. Another planet can be seen farther west, in the constellation of Virgo, the virgin, though it is much fainter. This is Mars, which sets about two hours after the sun. The cause of its faintness is its great distance. Last Feb. 17 it was shining brilliantly in the evening sky, for then it was only 62,950,000 miles from us. Now it has swung around to the far side of the sun and, on Aug. 1, its distance is 167,410,000 miles.

As for the other planets, both Mercury and Saturn are invisible in August because they are so nearly in line with the sun. Venus, however, shines brilliantly in the early morning sky, about seven times as bright as Jupiter. It rises in the east several hours before the sun.

Brightest of the stars of the August evening is Vega, almost directly overhead, in the constellation of Lyra, the lyre. Second is Arcturus, in Bootes, the bear driver, half

way up in the western sky. Then comes red Antares, in Scorpius, low in the south, which is followed by Deneb, in Cygnus, the swan, high in the east. Last of the first-magnitude stars seen these evenings is Altair, in Aquila, the eagle, high in the south.

Though several comets discovered by astronomers in recent months are now in various parts of the sky, none of them has become a conspicuous object to the naked eye. It has been nearly 40 years since a really spectacular comet has been visible, a period somewhat longer than the average over recent centuries, so perhaps it may not be long before we have another. Such comets usually have such long periods, of thousands of years, that we have no accurate records of their past appearance, and thus they cannot be predicted.

Perseid Meteors

Sometimes, however, a comet ceases to appear as such, but continues in the ghostly form exemplified by the Perseid meteors that reach their height about Aug. 12. The reason that we see these every year about the same time is due to the fact that they are moving about the sun in a long, elliptical orbit, which happens to intersect that of the earth at the position we occupy in early August. Naturally, therefore, we cannot see them at other times, though there are other meteor swarms, which we pass, for example, in April, November and December.

Thus, when these fast moving particles become visible as they are heated by their encounter with the earth's atmosphere, the paths of light which they make seem to converge in the distance. This is an effect

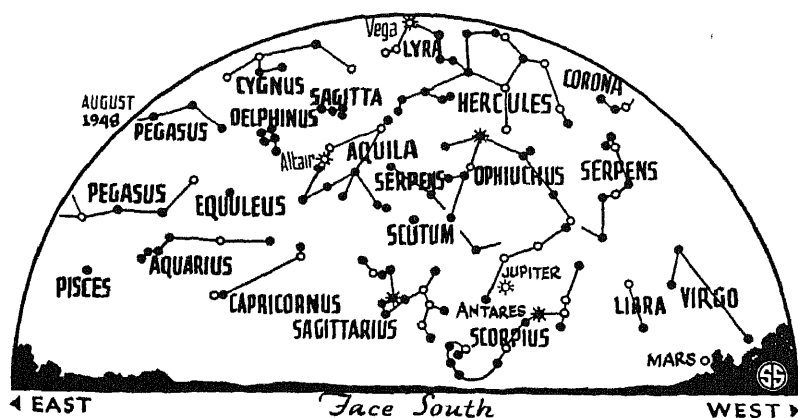
of perspective, just the same as that which makes the parallel tracks of a railroad seem to come together toward the horizon.

The Perseid meteors had long been observed by the year 1866, when the Italian astronomer, Giovanni Schiaparelli, was studying the orbit of a comet that had appeared a few years before, in 1862. This had been barely visible to the unaided eye, not at all spectacular. He found, however, that its orbit was practically the same as that in which the Perseid meteor swarm travelled. This, together with later discoveries of the identity of the orbits of other comets and meteor swarms, made it evident that the showers are the debris of the comets.

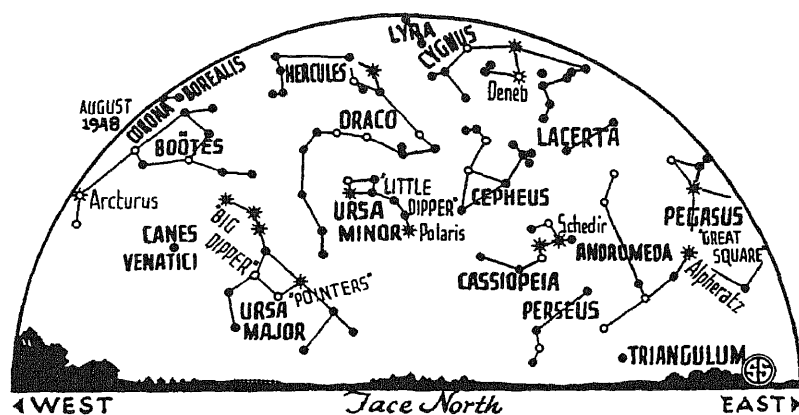
Leonid Shower

In some cases the meteors are concentrated at one point. This is true of the ones that we see in November, called the Leonids. Though two of the greatest showers on record were Leonids, in recent years they have been quite sparse. The Perseids, however, are very consistent, which indicates that they are quite uniformly distributed throughout their orbit.

The observation of meteors is one field in which amateurs can be of considerable assistance to the professionals. Astronomers who study meteors are anxious to get as full reports as possible of the numbers in the showers. The simplest sort of observation is simply a count of the total numbers during half-hourly periods, say from 11:00 to 11:30, 11:30 to midnight, and so on. Several people may cooperate in such counts, each taking one part of the sky. The numbers recorded may be sent in to Dr. C. P. Olivier, Director of the Flower Observatory of the University of Pennsylvania, at Upper Darby, Pa. This observatory is one of the principal centers of meteor study.



★ ★ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



In addition to the numbers of meteors, a statement of the location, cloud conditions, names of observers, etc., should be reported. If any unusually bright meteors appear, their path among the stars should be reported, as accurately as possible. From such data, obtained at scattered locations, the real path of the meteor in the sky may be calculated.

Observers are often fooled into thinking that a meteor falls much more closely than it does. Some years ago, when I was connected with a museum in Philadelphia, a very brilliant meteor, or "fireball," flashed over the city, toward the northeast, in the early morning hours. The next day I received a phone call from a taxi driver. He said he had been returning home just as it appeared, and that it landed in the field near his house. If we wanted it, he would get it for us. Though doubting that it was so close, I assured him we would be delighted to have it. A few days later he

called again, to say that he still had not found it, but expected to do so soon, and he would keep on hunting. We never heard any more from him. This was hardly surprising, since astronomical calculations, made on the basis of reports from a number of northeastern states, showed that it had passed over Connecticut, and had fallen in the sea several hundred miles east of Massachusetts!

Time Table for August

Aug.	EDST	
2	1:28 a. m.	Moon passes Venus
5	12:13 a. m.	New moon
	4:00 p. m.	Moon nearest, distance 222,400 miles
9	12:46 a. m.	Moon passes Mars
11	3:40 p. m.	Moon in first quarter
12-13	after midnight	Perseid meteors
14	12:24 a. m.	Moon passes Jupiter
19	1:32 p. m.	Full moon
20	5:00 a. m.	Moon farthest; distance 252,600 miles
27	2:46 p. m.	Moon in last quarter
30	11:15 p. m.	Moon passes Venus

Subtract one hour for CDST, two hours for MDST, and three for PDST.

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AGRICULTURE

Chinese Re-Plant Willows

➤ CHINESE capacity for self-help, and therewith China's chances for getting "off relief" on a world-burdening scale, are being tested on a small but encouraging scale on the island of Pa Kua Chou, in the Yangtze river about six miles downstream from the city of Nanking.

A population of about 10,000, mostly farmers, support themselves on the island, which has approximately 10,500 acres of farmland and some 1,200 acres of swamp. They would probably never have needed to ask help from anyone, but for a crisis produced by the war.

When the Japs moved into this part of China, they cut the island off completely, forcing the inhabitants to use up for fuel the willow-trees that had formerly lined its dykes and shores. This had two disastrous effects: the islanders could no longer weave baskets, and rapid erosion began to rob them of their soil.

To set the people of Pa Kua Chou back on their feet again, a cooperative project

for planting more than 2,000,000 willow cuttings was undertaken by a group of Chinese and foreign agencies, including the Extension Commission, the National Forestry Research Bureau, the China Relief Mission and the Food and Agriculture Organization of the United Nations.

The cuttings were made from willows elsewhere along the river, the work being done by refugee labor paid for by the China Relief Mission.

From here on, however, the islanders took over. As most of the cuttings were brought to Pa Kua Chou, they became the property of the farmers, who planted them on their own land. Some of the cuttings, planted on public lands, became public property and will be administered by a committee representing the cooperating agencies and the farmers' organizations. The farmers have agreed among themselves not to indulge in premature cutting.

FAO experts, who have served as advisers throughout the project, estimate that at

least 90% of the cuttings will live. In a few months, erosion will be checked, and there will be at least a little fuel available for winter use. However, withes suitable for basket-weaving will not be ready before the spring of 1950.

From here the farmers have made further advances on their own. On petition to the Nanking municipal government, they have obtained ten tractors and a considerable number of modern farm machines, as well as four large power pumps. These are to take the place of farm animals, formerly rented from the mainland at considerable cost. The farmers have organized a cooperative to take title to the machinery for the community, and to pay off the loan with which it was purchased. They will also have to face the problem of buying fuel and oil to keep their machinery running.

The experiment is proving the ability of the Chinese farmers to improve their lot by cooperation, as well as the value of joint effort on the part of government and private organizations. Most important of all, if the experiment succeeds it will serve as a model to be followed elsewhere in China's big job of getting out of the hole

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Do You Know?

Shadetree *trunks* are sometimes split open by excessively low temperature.

Some *gelatin* for food and emulsions is made from pigskins.

Color, according to some scientists, definitely possesses properties that make people feel warm or cold, happy or depressed.

The normal time for an *iceberg* to travel from the West Greenland glaciers to the steamer lanes south of Newfoundland is about two and one-half years.

Babies are born calcium-poor because their bones must be soft to permit passage into the outside world; after birth they need calcium-rich food, such as milk, to give strength to their bones so that they will develop normally.

A radio-controlled *lightship*, now about ready for testing in a Maryland bay, carries no permanent crew; the vessel's light, fog signal and radiobeacon will be controlled by radio from a shore station.

The highest *mountain peak* on each of the five principal continents is Everest in Asia, Aconcagua in South America, McKinley in North America, Kilimanjaro in Africa and Mont Blanc in Europe; they are listed in order of their heights.

CHEMISTRY

Chemicals Cut Swelling Of Wood from Moisture

► WOOD in window sash and bureau drawers can be protected from swelling in humid weather and shrinkage in dry periods by recently developed chemical treatments, the American Chemical Society was told at a meeting in Cambridge, Mass., by Dr. Alfred J. Stamm and Dr. Harold Tarkow of the U. S. Forest Products Laboratory, Madison, Wis.

Wood in its natural state contains a relatively large amount of empty space, chiefly in the form of fiber cavities and pores. Introduction of synthetic resins, or plastics, of the phenol-formaldehyde or urea-formaldehyde types within the cell wall structure provides bulk for the fiber walls and minimizes both swelling and shrinkage, they said.

Treating wood with a compound called acetic anhydride, a distant relative of vinegar, also bulks the fiber and reduces shrinking and swelling by altering the basic molecular structure. A type of wax that is insoluble in water may be used but the process of getting the wax inside the cell walls is complicated. Sugar and certain salts give satisfactory temporary results, but they wash out of the wood rather easily.

Science News Letter, July 24, 1948

ICHTHYOLOGY

Fish Bite When Hungry

Anger or hunger will make fish bite, but when they are full they will take no more for 24 hours. Their appetites vary from day to day, season to season.

► TO BITE, a fish must either be angry or hungry.

So says Dr. Samuel Eddy of the University of Minnesota zoology department and thus he concisely sums up the question pondering anglers for centuries.

Hunger is the main reason fish bite. Normally they start feeding early, spend the middle of the day digesting their catch and then toward evening may look around for a bedtime snack. When they are full they will take no more for 24 hours. Large fish work the hardest and longest getting their fill.

Fish appetites vary from day to day and season to season. Temperature is one factor. Fish are always hungry after spawning.

Last summer's poor fishing in many of the northern states was not due to overfishing or insufficient stocking but to abundant natural food. Instead of highly specialized diets, most fish will take whatever is available, including plants. Many eat their own young. Frogs actually are a small part of bass diet. Northerns and muskies will take almost any swimming animal they can swallow.

Most game fish locate food by sight, which is poor, otherwise they would not strike bits of wood and even pebbles. Motion is more important than details of lure structure.

Fish such as catfish, suckers and carp have well-developed senses of taste and others such as crappies, sunfish and rock bass seem to use a combination of taste and sight.

Some fish travel in schools and when one is caught there should be more. Northern pike tend to travel alone. Only artificial baits that give plenty of action should be considered.

Fishing is mainly an attempt to fool the fish into thinking a lure is something to eat. When the fish is not hungry all the art and cunning may not avail. Again, the biggest fish in the lake may pass up your luscious lure and take the worm offered by your small son at the other end of the boat.

When we cannot explain the fishes' behavior we call it luck. No doubt luck still plays an important part. If it were not for the element of luck, of the chance that you might catch the biggest fish of your life, much of the attraction would be removed.

Inventors of various devices to simplify the knack of catching fish, including calendars, almanacs, barometers and tables of moon phases and tides, probably will be unhappy about Dr. Eddy's conclusions. He implies that all this magic is refinement of

superstitions, conjured up by anglers of prehistoric times.

"Ever since prehistoric man invented the fish-hook," Dr. Eddy declares, "fishermen have tried all sorts of schemes to make fish bite it. Man soon found that sometimes he caught lots of fish and again he caught very few, and for thousands of years he has been trying to figure out why."

"First he blamed the spirits, then he figured moon phases probably were responsible, and even today you can still obtain almanacs and calendars (made out a year in advance) which tell you the days fish will bite."

As for the barometer, Dr. Eddy points out that a fish swimming a few feet up or down will encounter far greater pressure changes than normal atmosphere fluctuations. The fish has in his body a sort of barometer—an air bladder for buoyancy which is sensitive to pressure.

"So the real reason a fish bites," the fish expert asserts, "is because the fish is either hungry or mad."

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GENERAL SCIENCE

New German Science Group Honors Max Planck

► GERMAN SCIENTISTS have organized a new group, the Max Planck Society for the Advancement of Science, to replace the war-ruined Kaiser Wilhelm Society. Its first meeting was held recently at Goettingen in the British Zone, famous for the university where much of the physical and mathematical research that eventually led to the development of atomic energy took place.

Prof. Max Planck, for whom the society is named, in 1918 received the Nobel Prize in physics for his development of the quantum theory, which is basic to much of later development in theoretical physics, especially in the field of light. He died at an advanced age in 1947.

The Max Planck Society is expected to operate throughout Bizonia, and is open to the adherence of all research institutes and other organizations who choose to become affiliated. It guarantees unfettered freedom of research to all component institutes, subject only to the Control Council's regulations on scientific research. It is expected that about 25 organizations, formerly members of the Kaiser Wilhelm Society, will join.

The well-endowed Kaiser Wilhelm Society was organized in 1911, and at the outset was scrupulously kept free of all

political control. However, during the Hitler regime it became so infiltrated with Nazism that after the war the four-power Allied Control Authority decided to dissolve it. Although this dissolution was never actually carried out, it seemed better to organize a replacement society as a nucleus for free research by German workers in scientific fields than to leave matters in a suspended and uncertain state.

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AERONAUTICS

Safer Rough-Water Hulls Promised for Flying Ships

➤ BETTER hulls for flying boats, particularly for landings and take-offs in rough water, are promised. They will have long, narrow bodies with curved noses and lengthened afterbodies, the Institute of the Aeronautical Sciences was told at a meeting in Los Angeles, by A. W. Carter, National Advisory Committee for Aeronautics, Langley Field, Va.

A series of related seaplane hulls having a wide variation in length-beam ratio have been investigated at the Langley laboratories, he said. It was found that an increase in hull length-beam ratio from six to 15 reduced the aerodynamic drag without appreciably affecting the hydrodynamic qualities in smooth water, reduced vertical accelerations and motions during landings in rough water, and reduced the structural weight required for a given load factor.

Practical tests of various hulls are now underway, conducted by the U. S. Navy. An amphibian plane has been so modified that interchangeable hulls may be used on it. The hulls can be removed and replaced easily by use of bolts. The first hull undergoing tests is the elongated type now on the new Navy Martin XP5M-1 patrol plane. The most striking feature of this is its so-called afterbody that extends to the extreme end of the plane. Two hulls designed by the National Advisory Committee for Aeronautics, both what are called planing-tail types, will be tested on the same flying boat.

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INVENTION

Stool Perch for Barbers Has Already Been Invented

➤ RECENT PROPOSALS that barbers and dentists should have stools on which to perch while they work seem to have been just a trifle late: the thing has already been invented. U. S. patent 2,445,000 has just been issued to Charles E. Paden of Pittsburgh, on an adjustable stool that rides on casters around the chair, to which it is attached by a pair of metal arms. The user can vary his distance, height and angle of operations at will.

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ENGINEERING

Roofs Supported on Air

This type of construction would be advantageous for medium-sized buildings, eliminating such obstructions as columns, trusses and beams.

➤ ROOFS of some future buildings will be supported on air, literally.

For medium to large one-story buildings, support of the roof by inside air pressure without trusses, interior bearing walls or columns seems practical. It is one way to decrease present high building construction costs.

The idea is not just an engineer's dream; it has had a successful tryout.

A grain-storage building was erected in Minneapolis in 1934. It was a structure with half-cylinder ends 50 feet in diameter, the over-all length of the building being 250 feet. The one-piece roof, of welded galvanized steel, attached with an air-tight joint at its edges along the outside wall, was satisfactorily supported by an air pressure of eight ounces supplied by ventilating fans. The building was dismantled at the end of a year because of the explosion hazard existing where grain dust is held in suspension.

Roofs supported by air pressure were given serious consideration during the war and tests were conducted at New York University for the U. S. War Production Board in 1944. Herbert H. Stevens, Jr., of New York, who is an authority on this type of construction, describes the roof as of circular or elliptical shape, made of thin, ductile sheet material. The enclosure formed by the roof, the floor and side-walls would be relatively air-tight. Air forced into the structure by ordinary ventilating fans raises and stretches the roof into a shallow dome shape.

"The air pressure would be reduced from about four ounces per square inch, needed to stretch the roof, to about one ounce per square inch which would be thereafter permanently required to support the roof, insulation, roofing, and such structures as lights, fireproofing and sprinkler system hung from the underside of the roof," he states. "About half of this pressure would be in excess of the total roof load and would serve to induce biaxial tensions throughout the roof membrane to resist depressing and oscillating effects of the wind."

The pressure could be maintained by continuous operation of only a small part of the ventilating system. Standby power would be required in case of interruption in the ordinary power supply. In case of extra load on the roof, as from snow, the inside air pressure would be increased automatically or otherwise. About one and one-third ounces of increased pressure would balance a one-foot load of snow.

The pressure required to support the roof would have negligible physiological effects on occupants of the building. Air locks to

retain the pressure need be little more than double-doored vestibules or revolving doors for people.

The merits of this type of construction lie chiefly in medium to large one-story buildings, according to Mr. Stevens. The method of roof support eliminates a great deal of the foundation structures, columns, trusses and beams found in ordinary buildings. Again, the interior is completely free of structural obstructions. A roof of 0.109 inches thick aluminum alloy could be used for spans of 900 feet, he declares.

A British patent has recently been allowed to Mr. Stevens for a roof supported by inside air pressure. An American patent, 2,079,461, was awarded to J. H. MacMillan, Jr., some years ago for similar construction. A report on the investigations at New York University was issued in 1944.

Science News Letter, July 24, 1948

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BIOCHEMISTRY

New B Vitamin Discovery

There is hope that it may have an anti-anemia effect, although at present only the mealworm has been found to need this new vitamin, christened B_T.

► DISCOVERY of a new B vitamin which may turn out to have an anti-anemia effect is announced by Dr. G. Fraenkel, of the Imperial College of Science and Technology, in the scientific journal, *Nature* (June 19).

The vitamin has been christened B_T, the letter T standing for the scientific name for the mealworm, *Tenebrio molitor*.

The mealworm needs vitamin B_T, in addition to at least eight previously known B vitamins and folic acid, for its growth and survival. Whether humans and other

animals or other insects need the new vitamin is not yet known. But Dr. Fraenkel points out that "there has scarcely been a case of a new B factor (vitamin) which was not ultimately proved to be of general significance."

Mealworms, he adds, react very sensitively to being deprived of folic acid as well as to lack of the new B vitamin. They may therefore be valuable for studying anemia where the lack of a convenient testing organism has always hampered progress.

Science News Letter, July 24, 1948

ZOOLOGY

Smallest Possible Mammal

► THE SMALLEST possible adult mammal (not known to exist) would weigh about one-twelfth of an ounce, or two and one-half grams. Any warm-blooded fur-bearer smaller than that could not eat fast enough to keep its body fires going, calculates Oliver P. Pearson, zoologist at the University of California.

Mr. Pearson bases his figures on measurements of the metabolism rates of shrews, the smallest of known mammals, which burn up their body-fuels faster than any of their larger distant relatives. The smallest of the shrews he studied, weighing 4.5 grams, had a metabolic rate more than twice as high, weight for weight, as a

field-mouse more than twice its size.

It has long been known that the larger a warm-blooded animal the more slowly its body-fires burn. Shrews, which look like midget mice but are not rodents at all, are fiercely carnivorous, devouring insects, mice and each other. They have to eat practically all the time; if they are kept without food for even a few hours they die.

The body weight at which food intake would just balance its utilization in the animal's life-processes works out, on the curves projected by Mr. Pearson, as near 2.5 grams.

Mr. Pearson offers his results in *Science* (July 9).

Science News Letter, July 24, 1948

CHEMISTRY

Products from Plastic

► SUITCASES and trunks, cabinets and trays are molded from one of science's newest plastic products—cellulose acetate laminate.

Several layers of resin-treated fabric are sandwiched between sheets of clear plastic to form a compact layer. As the weave and printed pattern of the fabric show through the transparent layers, a wide variety of designs is possible.

The fabric gives the laminated product its great strength and interesting appearance; the plastic protects it from being soiled or stained. Corners can be molded so they are well-rounded and water-proof.

Ten thousand kits containing samples of this laminate and other cellulose plastics are being distributed throughout the world to people interested in science. The kits were prepared by SCIENCE SERVICE with the cooperation of some of the coun-

try's outstanding producers of cellulose plastics.

Cellulose propionate, one of the newest cellulosic plastics, is used for optical frames and fountain pens. Pellets of cellulose propionate not only show the material ready to be molded, but also enable those receiving the kit to do a bit of molding on their own.

The pellets are merely heated on the stove and poured into a simple mold. Consisting of two pieces that fit snugly together, such a mold can easily be carved from bits of wood. The crude plastic article an amateur produces on his first try gives a rough idea of the molding process, but is a far cry from professionally formed articles such as the whistle included in the kit.

Short cotton fibers left on the seed after the first ginning are one of the chief sources of cellulose, basic material for cellulose

plastics. This blotter-like material is included in the kit along with cellulose acetate flake, pellets of cellulose acetate butyrate and a molded chip of ethyl cellulose.

The Cellulose Plastics Unit of THINGS of science, containing these specimens and museum labels for their display, as well as suggesting a number of experiments, may be secured by sending 50c to Science Service, 1719 N St., N. W., Washington 6, D. C., and asking for unit No. 93.

Science News Letter, July 24, 1948

METEOROLOGY

Automatic Electric Device Makes Own Wind Record

► THE WIND will make its own records on a portable electric device which can be left unattended in isolated places a month at a time, the Army Signal Corps revealed. In size it is slightly larger than an infantryman's pack.

The instrument makes a continuous record of wind directions and wind velocity on a moving roll of paper, which is long enough to make an 800-hour recording. It uses no ink. Records are made by electric spark holes through the paper.

This electric weatherman was developed for the Signal Corps by the General Electric Company, Schenectady, N. Y. Moving arms, connected electrically to a conventional anemometer, a wind velocity-measuring instrument, and to a weather vane, mark specially-sensitized paper by sending sparks through it. The instrument can register wind velocities up to 150 miles per hour and direction within 1.5 degrees.

Science News Letter, July 24, 1948

Reading

Is In Season!

Vacation time is the time for reading. Now you have the chance to catch up on older books, and get ahead with new. Keep posted on our Books of the Week. SCIENCE NEWS LETTER will gladly obtain for you any of these, or any other American book in print.

Send check or money order covering regular retail price (\$5 if price is unknown, change to be returned) and we will pay postage in the United States.

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Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publications direct from issuing organizations.

CANCER: Volume 1, Number 1—Fred W. Stewart—*Hoeber*, 176 p., illus., monthly, \$8.00 a year, \$2.50 a single copy. A new journal dealing primarily with human cancer and experimental work which has a relationship, even though remote, to human cancer. Excellent illustrations.

COLOR PHOTOGRAPHY FOR THE AMATEUR—Keith Henney—*McGraw-Hill*, rev. ed., 355 p., illus., \$5.00. All methods of making transparencies and color prints are treated largely from the author's own experience.

FAILURES IN PSYCHIATRIC TREATMENT—Paul H. Hoch, Ed.—*Grune & Stratton*, 241 p., illus., \$4.50. Papers presented before the American Psychopathological Association by distinguished scientists who discuss the shortcomings of various branches of the field.

THE FEEDING AND RELATED BEHAVIOR OF HUMMINGBIRDS—Frank Bene—*Branford*, 112 p., illus., \$2.50. A study of the hummingbirds that nested in the author's garden.

HOW TO PREDICT ELECTIONS—Louis H. Bean—*Knopf*, 196 p., \$2.50. A timely book telling why polls go right and wrong, the power of third parties, and how to read the meaning of political straws in the wind.

ISLAND LIFE: A Study of the Land Vertebrates of the Islands of Eastern Lake Michigan—Robert T. Hatt and others—*Cranbrook Institute of Science*, 179 p., illus., \$4.00. The fauna of islands interests naturalists because segregation speeds differentiation and often alters the habits of species.

LIMNOLOGICAL METHODS—Paul S. Welch—*Blakiston*, 381 p., illus., \$7.00. Providing a single source of information about the meth-

ods of study of life in fresh water, ordinarily scattered throughout the literature of other sciences.

LOVEJOY'S COMPLETE GUIDE TO AMERICAN COLLEGES AND UNIVERSITIES—Clarence E. Lovejoy—*Simon and Schuster*, 158 p., paper, \$1.50. Information for those planning to go to college. Supplanting an earlier book, "So You're Going to College."

OUR AMERICAN LAND: The Story of Its Abuse and Its Conservation—Hugh H. Bennett—*Govt. Printing Office*, 31 p., illus., paper, 10 cents.

PROGRESS IN NEUROLOGY AND PSYCHIATRY: An Annual Review, Volume III—E. A. Spiegel—*Grune & Stratton*, 661 p., \$10.00. This volume reviews more than 2,800 papers on basic sciences, neurology, neurosurgery and psychiatry.

A REAPPRAISAL OF PERUVIAN ARCHAEOLOGY—Wendell C. Bennett, Ed.—*Society for American Archaeology and the Institute of Andean Research*, 128 p., illus., paper, \$2.00. Formal papers presented at a conference on Peruvian archaeology.

THE STORY OF OUR TIME: Encyclopedia Yearbook, 1948—*Grolier Society*, 431 p., illus., \$7.50. The story of an important year told in text and photographs. Includes much on science.

UNDERWATER EXPLOSIONS—Robert H. Cole—*Princeton University Press*, 437 p., illus., \$7.50. Interesting to those concerned with the effect of explosions and also because of the information that the explosion data give about hydrodynamics.

Science News Letter, July 24, 1948

Asia Minor, plus many in South America, also Canada and the United States.

Direct national financing was found to be the practice in more than one-half the countries studied. Everywhere the trend seems to be toward the national governments assuming a greater share of the costs of irrigation. The greatest disparity in methods occurs, he said, in how the various governments recoup their investments. Perhaps the most significant single trend is toward liberalization of repayments from the direct project beneficiaries.

Federal governments, including the United States and some other countries, participate to a greater degree in paying for some other types of water-control programs than for irrigation. The policy of the United States, he stated, is to improve or participate in the improvement of navigable waters or their tributaries for flood-control purposes if the benefits, to whomsoever they may accrue, are in excess of the estimated costs and if the lives and social security of people are otherwise adversely affected.

Science News Letter, July 24, 1948

Magnetic *highway sweepers* which pick up nails and other metal scraps are now widely used in America; where used they gather an average of 8.2 pounds of metal per mile per year, 75% of which is tire-damaging material.

MEDICINE

Counteract Barbiturates

► PEOPLE who take overdoses of the barbiturate sleeping medicines, either by accident or with suicidal intent, may in future be saved by having a kind of tourniquet put around the middle of the chest to constrict it.

This possibility appears in a report by Drs. Augustus C. P. Bakos and William L. Howell of Georgetown University School of Medicine in the journal, *Science* (July 9).

The barbiturate sleeping medicines affect the breathing center in the brain. When a poisonously large dose has been taken, breathing goes on only through reflex drives. But at this stage, the rate of breathing in dogs can be increased by compression of the chest, the Georgetown scientists found. The compression was done with the kind of cuff doctors use in taking blood pressure. This seemed to elicit and maintain a reflex from the lungs which kept the animals breathing even when the breathing center in their brains had been deadened by the drug.

Preliminary observations, the scientists report, show that the maneuver may be effective in cases of barbiturate poisoning, although not enough data have been obtained to be sure.

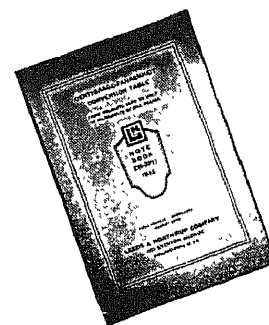
Science News Letter, July 24, 1948

ENGINEERING

Most Nations Sponsor Big Water Control Projects

► MOST national governments provide the funds directly for construction of major water conservation and control structures, including those for irrigation, the International Congress on Large Dams was told at its meeting in Stockholm, Sweden, by Michael W. Straus, American Commissioner of Reclamation.

He reported on a study made of practices in 21 nations, perhaps the first world-wide investigation of this subject ever made. The study included Australia, New Zealand, Russia, China, India and the nations of



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⚙️ **TOOTHBRUSH COMBINATION** has a hollow plastic handle to hold enough toothpaste for several brushings. The paste is applied to the bristles internally by pressure from a plunger contained in the handle which forces the paste through a tiny capillary tube.

Science News Letter, July 24, 1948

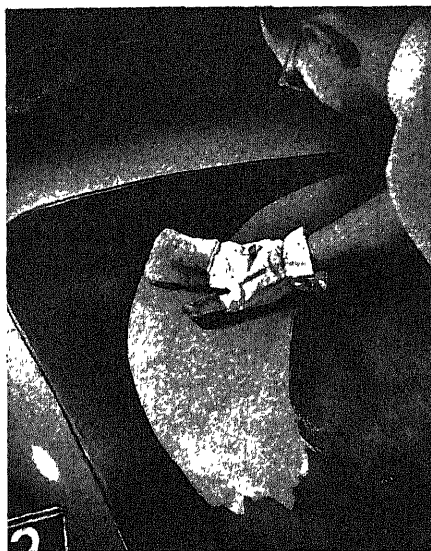
⚙️ **HEARING AID**, for temporary use by persons with slight hearing loss or for anyone whose hearing level is below ordinary conversation, is a single unit to be carried in the pocket and held to the ear only when needed. Microphone, vacuum tubes, batteries and other essentials are all within the half-pound package.

Science News Letter, July 24, 1948

⚙️ **RUBBER MAT** for the relief of fatigue from standing contains several thousands of small resilient cells which provide shock-absorbing action, without any annoying sensation of too much softness. Because of the ridged underside construction, it is safe from skidding.

Science News Letter, July 24, 1948

⚙️ **AUTOMOBILE PAINTING** mitt, shown in the picture, replaces the brush



and consists of a moisture-proof fabric to which a cotton pile fabric, with which the paint is applied, is attached with snappers. The mitt is part of kit which contains enough of a free-flowing enamel paint to cover a car twice, and also a dirt-remover, sandpaper and a crack-filler.

Science News Letter, July 24, 1948

⚙️ **VENT PLUG** for a storage battery tells the water level at a glance without removal of the plug. The device, made of clear plastic, extends down into the battery with its lower end, which is a pyramid in shape, immersed if it is at a proper level. Looking down the vent the bottom is black if immersed in water; otherwise the words "add water" are visible.

Science News Letter, July 24, 1948

⚙️ **ELECTRIC CORN POPPER**, now patented, is a covered vessel with a side handle, and a heating element enclosed in a space in its bottom somewhat similar to the arrangement in an electric coffee maker. An added feature is a wire agitator, with a crank end above the cover, which can be rotated to prevent the corn from burning.

Science News Letter, July 24, 1948

⚙️ **VENETIAN BLINDS** become a removable slat type with the use of special clips through which the ropes pass instead of through slots in the individual blades. The clips are easily fixed in place on the rear of the ladder tape by means of their piercing points. Slat may then be removed for easy cleaning.

Science News Letter, July 24, 1948

• Nature Ramblings

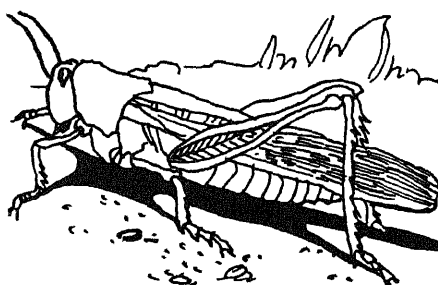
by Frank Thorne

► **OYSTERS**, especially if served raw, are very likely to provoke that classic wisecrack about the degree of courage that must have been possessed by the first man who ever ate an oyster. There are, of course, plenty of people who haven't plucked up that much courage even yet. To whom the true ostreophile always remarks, "So much the better; it leaves more oysters for me!"

Whoever the first oyster-eater was, he must always remain nameless, for he was prehistoric. There is, however, no need for erecting a monument to his anonymous memory, for he and his numerous descendants have left plenty of monuments to their liking for oysters and other shellfish on beaches all over the world. There are shellmounds that the uninitiated easily mistake for low natural hills. These are the accumulated relics of oyster-roasts and clambakes that must have gone on continuously for centuries. There are even similar mounds of snail-shells in North Africa—the obvious witticism being that this must be the original home of Frenchmen.

But oysters and clams and snails are only

Was It Courage?



the beginning of the catalog of strange foods that people eat in various parts of the world. Insects, both as larvae and adults, are prominent items. Tastiest, probably, would be the grape-bellied honey-ants of Mexico. More widely distributed is the eating of locusts, which are simply big, fat grasshoppers: these dainties are consumed in many lands where locusts swarm, all the way from the Mediterranean basin to the Philippines. There has even been a government bulletin giving recipes for their

proper preparation and cooking.

Strange sea dainties are to be found on the menu, too: squid and sea-urchins in southern Italy, sea-cucumbers and the giant sea-worm known in its dried form as *beche-de-mer* in the South Seas, and of course the inevitable bird-nest soup and shark-fins of "real" Chinese restaurants. Raw fish is eaten just about everywhere. Mark Twain recorded, with a proper inlander's shudder, seeing native Hawaiians eating fish "raw and alive!" when he visited the islands eighty-odd years ago.

The chances are that this business of eating "queer" foods was pioneered not by any bold man but by one of our pre-human ancestors who was merely hungry and lacked the means for killing and cooking larger game. Certainly our existing simian poor relations are not too discriminating in their choice of tidbits; some species of them at least will eat insects and their grubs, eggs and young birds, centipedes, scorpions and fat spiders. It may be, after all, that oyster-eating is just an evolutionary hang-over.

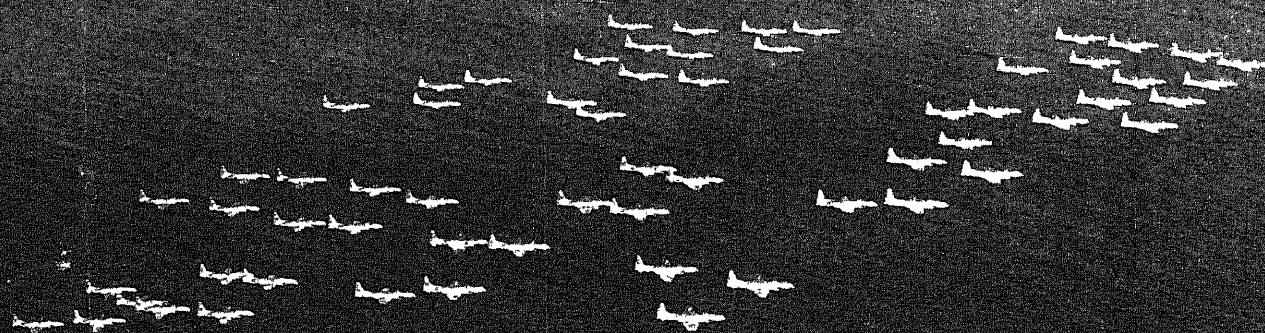
Science News Letter, July 24, 1948

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JULY 31, 1948

SCIENCE NEWS LETTER

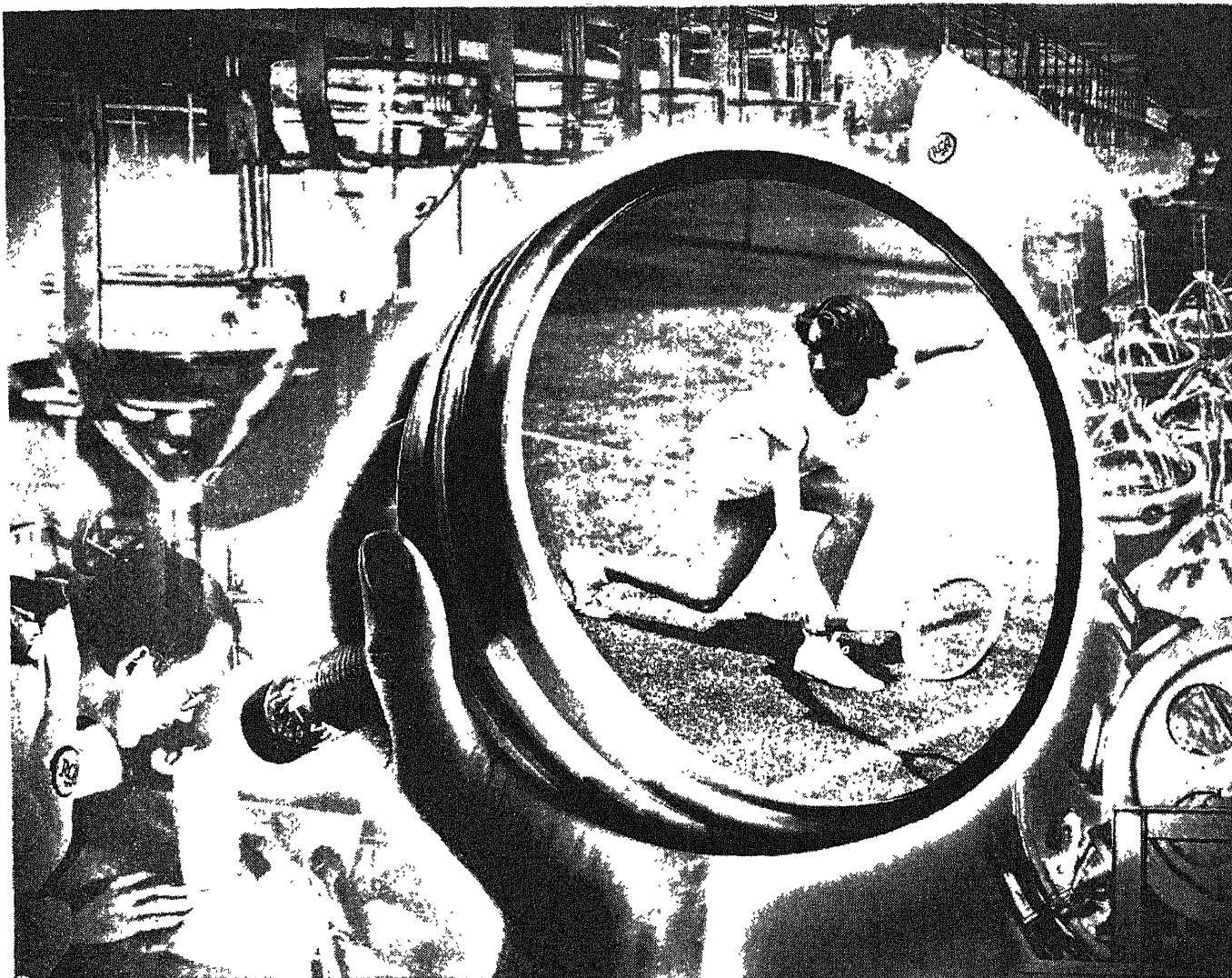
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Jet Armada

See Page 79

A SCIENCE SERVICE PUBLICATION



Machines in RCA's Lancaster Tube Plant are designed for mass production of Kinescopes—television picture tubes—at lowest possible cost.

Behind the magic of a Television Tube

Every morning, 14 tons of glass "bulbs" go down to the production lines at the RCA Tube Plant in Lancaster, Pa.

By evening, the bulbs are television picture tubes, their luminescent faces ready to glow—in television homes everywhere—with news, sports, entertainment, education, politics.

Born of glass, metals, chemicals, the picture tube comes to life through flame and heat. Its face is

coated with fluorescent material—forming a screen on which an electron gun "paints" moving images.

Each step is so delicately handled that, although RCA craftsmen are working with fragile glass, breakage is less than 1%.

Water, twice-distilled, floats the fluorescent material into place on the face of the tube, where it clings by molecular attraction—as a uniform and perfect coating.

Every phase of manufacture conforms to scientific specifications established by RCA Laboratories. Result: Television tubes of highest perfection—assuring sharp, clear pictures on the screens of RCA Victor home television receivers.

When in Radio City, New York, be sure to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. Radio Corporation of America, RCA Building, Radio City, New York 20.



RADIO CORPORATION of AMERICA

MEDICINE

Polio Checked by Drug

This chemical, belonging to the sulfa drug family, may herald the conquest of virus diseases among which is the common cold.

➤ THE chemical conquest of virus diseases, which range from the common cold to encephalitis, or sleeping sickness as it is called, is heralded by the discovery of a chemical that stops infantile paralysis.

A number of polio victims are said to be walking around today, thanks to the chemical, called phenosulfazole, with trade-name of Darvisul, instead of being paralyzed and crippled for life. The drug has been given to more than 70 patients already this season and several hundred will probably get it within the next two months.

The chemical is a modified and very peculiar and interesting sulfa drug. It was developed by Dr. Murray Sanders of Columbia University College of Physicians and Surgeons and eight chemists of Lederle Laboratories.

First trials of the drug started on patients in Texas this summer, after extensive studies with mice and monkeys showed what it could do and that it was non-toxic and therefore safe to use.

Just how many cases have been aided by the drug in the Texas trials will need to be determined by exhaustive tests upon the patients who seem to have had beneficial effects from the drug.

There is plenty of the drug. It is being supplied to physicians provided they can give reasonable assurance that they can accurately study the patients. This is necessary with any new drug while proper dosages are being worked out. Dr. Sanders feels now that some patients should be treated more vigorously than others. But this type of knowledge could not be gained without the trials now under way.

Besides the problem of dosage, there is another reason for being careful that the drug goes only to responsible persons. This is that otherwise many patients who did not have polio might get it, instead of getting some medicine they did need.

Dr. Sanders and Lederle had hoped to have news of the drug reach physicians through regular scientific channels before it became public knowledge but this was prevented by premature reporting. His work was not done under a grant from the National Foundation for Infantile Paralysis, and was not reported to the recent International Poliomyelitis Conference.

There does seem to be a good chance that due to the public attention focused upon this new chemical agent, even prior to scientific publication, more doctors will join those now evaluating the drug clinically.

Formal statements about the results will

continue to be withheld until later. The drug is reported to be in ample supply and there is a polio epidemic. For these reasons, more progress in testing the new treatment will be made in the coming weeks than otherwise would be the case.

Meanwhile with an infantile paralysis

METEOROLOGY

Prevent Spread of Gases

➤ TWO WEATHER observation towers to provide information which will guard against the spread of radioactive gas are nearing completion at Brookhaven National Laboratory in Upton, N. Y.

The purpose of these towers is to permit study of wind currents so that radioactive gas can be prevented from spreading from the nuclear reactor or chain reacting pile which will be finished this fall.

The nuclear reactor will be cooled by air. Contaminated air will be conducted

away from the pile by large fans and sent through an air duct and up a 300-foot stack on a nearby hill. This air will contain minute quantities of radioactive argon gas. Study of wind velocity and direction, and atmospheric pressure from the towers during operation of the pile will make it possible to control the pile so that the radioactive gas will be sent up into the upper atmosphere where it can do no harm and not settle near the ground. If weather conditions are unfavorable the

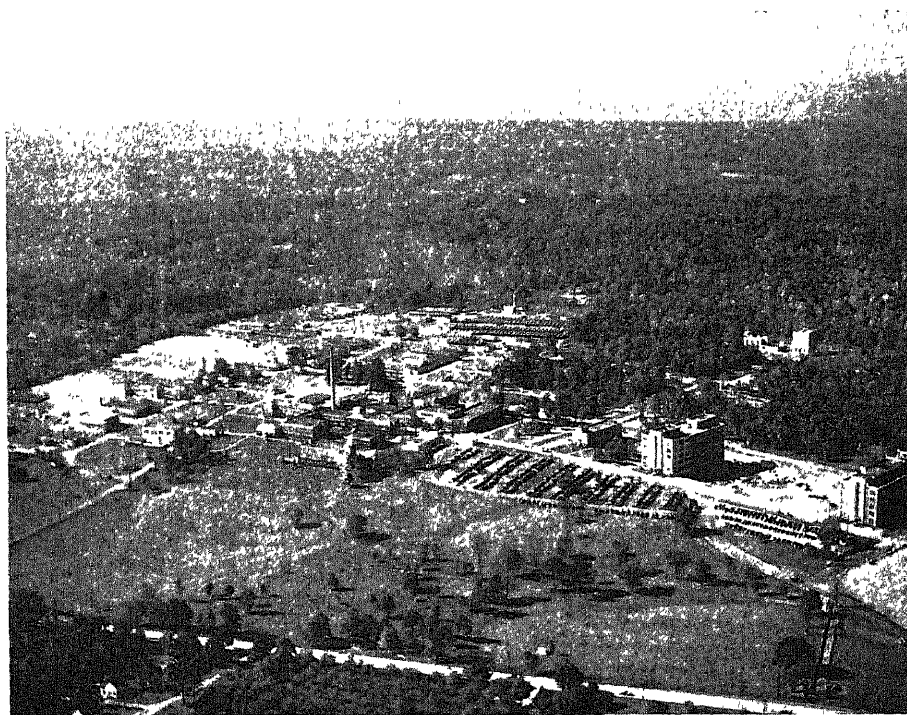
epidemic in Texas and North Carolina and possibly spreading elsewhere, facts about this important advance have been obtained and reported by Science Service.

There have been some failures with the drug. If motor nerve cells have been destroyed, the drug cannot be expected to restore them. But it can stop the progress of the infection to more nerve cells and can prevent deaths from polio.

The unique feature of the drug, that it can stop a virus disease, gives hope that this or other drugs can be made to stop other virus diseases.

Full details about Darvisul are now scheduled for reporting at a New York Academy of Sciences conference on Aug. 23.

Science News Letter, July 31, 1948



LEDERLE LABORATORIES—Two new drugs have recently come from here—the anti-polio chemical, phenosulfazole, which may prove effective against other virus diseases, and the antibiotic, aureomycin, which may check diseases not touched by either penicillin or streptomycin. (See p. 69). This is an aerial view of the laboratories in Pearl River, N. Y.

nuclear reactor will be stopped.

The design of the observation towers was supervised by the Brookhaven Meteorology Group, headed by Norman R. Beers. Working with the group is a special station of the U. S. Weather Bureau, headed by Raymond C. Wanta.

The taller of the two towers, which is to be 420 feet high or as tall as a 35- or 40-story building, will be the tallest structure on Long Island, laboratory officials believe. It is to be completed soon. The second tower, 160 feet high, is already complete. There will be platforms, five on the small tower and eight on the large one, where observers can take readings from weather-recording instruments.

Weather instruments on the towers will be mounted on beams which can be swung away from the towers and then pulled in

for observation. In addition, weather observations will be recorded electrically on an instrument panel in a building 900 feet away from the towers. The building has to be this far away from the towers so that eddies created by winds passing over the building will not disturb observations made by instruments on the towers. Two electrified cables between the towers will carry instruments to record temperature and wind differences between them.

Another feature of the tall weather tower will be a smoke stack which will carry only smoke created for the purpose of studying wind and weather. This is a 20-inch steel pipe running the height of the stack, and it will give off smoke produced by a surplus Army M-1 smoke generator, similar to those used in spreading smoke screens.

Science News Letter, July 31, 1948

Letters To The Editor

Up-To-Date Matter

My appreciation for "Laws of Matter" (SNL, June 19). Many of us needed this to bring us up-to-date.—Ralph C. Max, D.D.S., Hartsville, Mo. *We're planning to do this for other fields, thanks*

Gained Inspiration

I have read "Nature Ramblings" pretty regularly for about five years and have enjoyed them all, but the one on "Force-of-Habit Farming" (SNL, July 10) really stirs me up to want to do something about it.

I am not a farmer. I am a retired physician with gardening as a hobby, but I have a hunch that you have given me the idea I have been needing.—Walter Rittenhouse, San Diego, Calif.

We are glad that it stirred you to thoughts of trying to make your San Diego

County hillsides pay for their keep. If they can be induced to yield something good for food, either directly or via the medium of some food animal, there surely will be hope for more fertile, better watered hillsides elsewhere!

Why The Patient?

I can't refrain from commenting on the article entitled "X-Ray Photos by Wire" (SNL, July 3). Would it have taken a master mind to think of transporting the pictures in question to the nearby large city instead of the patient? I assume that the small town hospital had at least a telephone so that the large city radiologist could have phoned back his findings on receipt of the pictures.—Joseph G. Landauer, Hollywood, Fla.

The method was developed to do just that—transport the pictures rather than the patient, and in a minimum of time.

Question Box

ARCHAEOLOGY

What ancient inscription is to be completely copied for the first time? p. 76

What signs of violence have been found in ancient Sinai? p. 78

GENERAL SCIENCE

What election forecasts have been made by a veteran predictor? p. 78

MEDICINE

Against what germs is the new antibiotic effective? p. 69

What new drug may herald the conquest of virus diseases? p. 67

Photographs: Cover, U. S. Air Force; p. 67, p. 69, Lederle Laboratories; p. 70, Post Office Department; p. 74, National Retail Lumber Dealers Assoc.; p. 75, Ingersoll Steel Div. Borg-Warner Corp.

MEDICINE-PHYSICS

What weapon will be used in the new attack on cancer? p. 79

METALLURGY

How will ceramic coatings make more dependable jet and rocket engines? p. 70

METEOROLOGY

How will the spread of radioactive gas be prevented? p. 67

PHYSICS-ASTRONOMY

What is the latest theory on the evolution of the universe? p. 71

Science Service Radio

►LISTEN in to a discussion on thunder and lightning flying on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDT Saturday, Aug. 7. Maj. Gen. H. M. McClelland of the Military Air Transport Service, Gravelly Point, Va., as the guest of Mr. Watson Davis, director of Science Service, will tell the hazards of flying in thunderstorms and of the project the Air Force and Weather Bureau were working on together.

Science News Letter, July 31, 1948

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MEDICINE

New Potent Antibiotic

Preliminary trials show that it holds promise of conquering diseases which streptomycin and penicillin have not proved effective against.

➤ A GOLDEN-YELLOW DRUG, cousin to streptomycin but promising to conquer diseases which streptomycin and penicillin do not touch, was announced at the New York Academy of Sciences.

The drug is called aureomycin, the "aureo" part of its name coming from the Latin for gold, and the "mycin" showing that it comes from a kind of fungus, like streptomycin.

Aureomycin was discovered by Dr. B. M. Duggar of the Lederle Laboratories division of the American Cyanamid Company. These are the same laboratories that produced the new sulfa drug now being tried in cases of infantile paralysis.

The golden-yellow fungus drug is effective against germs of the staphylococcus family, such as cause eye infections, against some viruses and some germs called rickettsia. Q fever, Rocky Mountain spotted fever and both typhus and scrub typhus are among the diseases caused by rickettsias.

Trials of aureomycin on patients have been made in Boston, Minneapolis, at Columbia University, at Johns Hopkins in Baltimore and Gallinger Municipal Hospital in Washington, D. C.

"Excellent results" in treatment of patients with Rocky Mountain spotted fever have already been obtained with aureomycin, a group of Johns Hopkins medical researchers reported.

The members of the Hopkins group are Drs. Morton S. Bryer, Emanuel B. Schoenbach, Caroline A. Chandler, Eleanor A. Bliss and Perrin H. Long.

This group has also used the new drug to treat patients with urinary tract infections. Again, they report, excellent results were obtained.

"A valuable addition" to other drugs such as penicillin and the sulfas is their summing up of their nine months' experience with it.

Its first public announcement at the New York Academy of Sciences was followed by other enthusiastic reports from the physicians who have been testing it clinically.

Some of the patients treated for eye infections were physicians. These doctor-patients had had recurrent conjunctivitis, commonly known as pink-eye, for many years and had come to believe that no drug was any good for these infections. Aureomycin treatment was given to them by Dr. Alson E. Braley and Dr. Murray Sanders of Columbia University.

"They were emphatically enthusiastic about the drug and thought the cure was even more rapid than with penicillin," the Columbia scientists reported.

Aureomycin was effective in all staphylococcus eye infections, provided it was used over a period of several days, and produced excellent results in influenza conjunctivitis.

All of a group of 25 patients suffering from another disease, lymphogranuloma venereum, were helped in varying degrees by the drug, Drs. Louis T. Wright, Myra A. Logan, Aaron Prigot and Lyndon M. Hill reported. These patients were treated at Harlem Hospital.

In eight cases of buboes, one form of this usually stubborn disease, all patients showed reduction in the size of the gland after four days of treatment.

"This was an event which in our experience over 24 years with several hundred cases of early lymphogranuloma has never occurred spontaneously in so short a time," the physicians declared.

They believe that the 25 cases represent infections with multiple strains of the virus causing the disease. The activity of aureomycin, therefore, may not be limited to a single strain.

Much of this work is still in the preliminary stage. But trials in Q fever, mixed

bacterial eye infections and a virus-caused venereal disease called lymphogranuloma venereum have reached the stage where the drug may soon be released generally for use in such ailments.

Aureomycin and the anti-polio sulfa drug are the two latest weapons that have been made available to doctors in the past decade. They promise to join the other sulfa drugs, penicillin, streptomycin, polymyxin, and chloromycetin in combatting infections.

Aureomycin should not be confused with the new anti-polio drug, Darvisul. It is not an antibiotic but a modified sulfa drug.

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CHEMISTRY

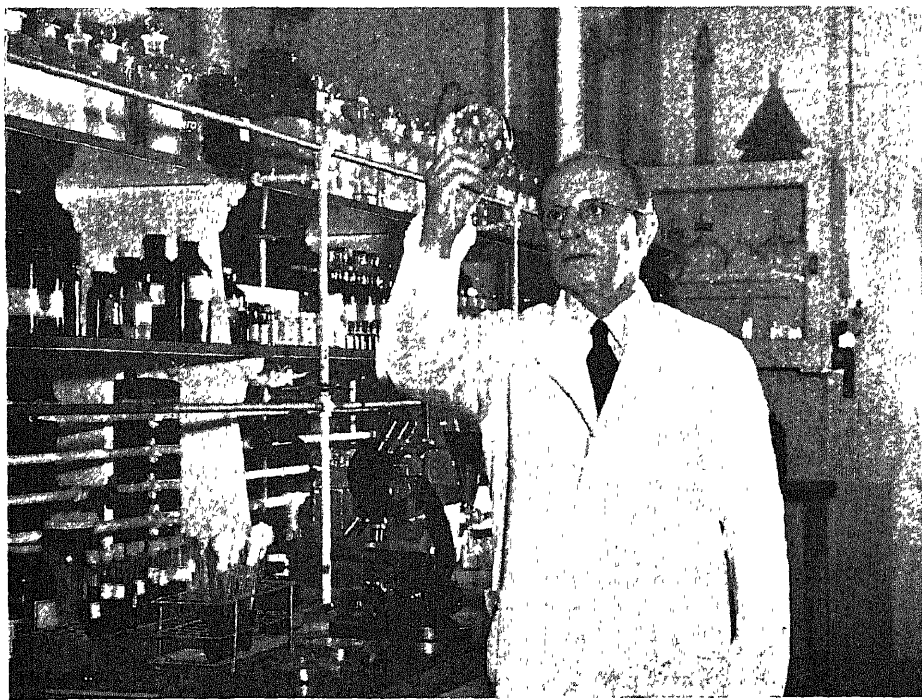
Penicillin Trade Names Becoming too Numerous

➤ "WE NOW OFFER five to one on P. O. B."

It may sound like the latest from the race track, but it comes instead from the editor of the *Journal of the American Medical Association* (July 17).

"P. O. B." is the trade name of a penicillin product. The journal editor, Dr. Morris Fishbein, says it's five to one doctors won't know the nature of the product from that name. Previously he offered, editorially, odds of eight to five that doctors would not guess the nature of a product called "Penioral."

The point of his editorial spoofing is that trade names for penicillin are becoming so numerous and confusing even doctors cannot keep up with them. In protesting a



AUREOMYCIN DISCOVERER—Dr. Benjamin M. Duggar, microbiologist at the Pearl River Laboratories of Lederle Laboratories Division, American Cyanamid Co., first isolated the fungus from which was obtained the new golden-colored drug.

trend to combine the name of the manufacturer with "cillin" he points out that there are almost 30 manufacturers, which offers almost 30 possible names for penicillin.

And here's our tip to anyone wanting to take up the five-to-one offer on P. O. B.: It should pay off on penicillin in oil and beeswax.

Science News Letter, July 31, 1948

METALLURGY

Ceramics in Jet Nozzles

High temperature metals are undergoing investigation in order to develop ceramic coatings which will enable them to resist the high heat of jets and rockets.

➤ MORE dependable ram jet, pulse jet, turbo-jet and rocket engines will result from investigations under way to develop ceramic coatings for high-temperature metals to protect them from the excessive heat in these devices used in high-speed planes, guided missiles and rockets.

The studies are being conducted by the National Bureau of Standards under the sponsorship and with the financial aid of the National Advisory Committee for Aeronautics. The first of them was with ceramic-coated molybdenum, and results now announced indicate that the oxidation of this metal is greatly retarded by some of the coatings tried.

Molybdenum is a logical metal for use in these high-temperature applications because it is available commercially in substantial quantities and it has the extremely high melting point of 4,750 degrees Fahrenheit. In order to use it at high temperatures in the presence of oxygen it must be protected against what otherwise would be a rapid oxidation.

Many high-temperature alloys have been developed during the past few years, but most of them begin to melt within the temperature range of 2,400 to 2,600 degrees Fahrenheit and, while suitable for some applications, are not for others. Of the metals having melting points greatly exceeding this temperature range, only platinum and iridium, melting at 3,180 and 4,260 degrees respectively, withstand oxidation at high temperatures without protection. Their cost, however, is prohibitive.

Other metals that have high melting points, but do not have good oxidation resistance, include titanium, thorium, zirconium, boron, molybdenum, tantalum and tungsten. The last three are of special interest from the standpoint of potential application in very high-temperature service. The first four have high melting points but below that of molybdenum, tantalum and tungsten have higher melting points, 5,160 and 6,100 degrees Fahrenheit respectively.

Preliminary tests have indicated that both tungsten and tantalum may be coated to protect against oxidation; however, the more complete tests have been made on molybdenum, not only because this metal is available in substantial quantities but

because there are comparatively large ore deposits in the United States. The coatings, which contain various combinations of such compounds as zirconium oxide, Florida kaolin, calcined kaolin and sodium nitrite, and methods of application to the metal, are described in a recent report of the National Advisory Committee for Aeronautics.

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MEDICINE

Neutrons Disappointing In Cancer Treatment

➤ NEUTRONS, the fundamental atomic particles which are so important in fission, have turned out to be less effective in the treatment of cancer than was once hoped.

Rather discouraging results from the only series of cancer patients treated with fast neutrons are reported by Dr. Robert S. Stone, of the University of California Medical School, San Francisco, in the *American Journal of Roentgenology and Radium Therapy* (June).

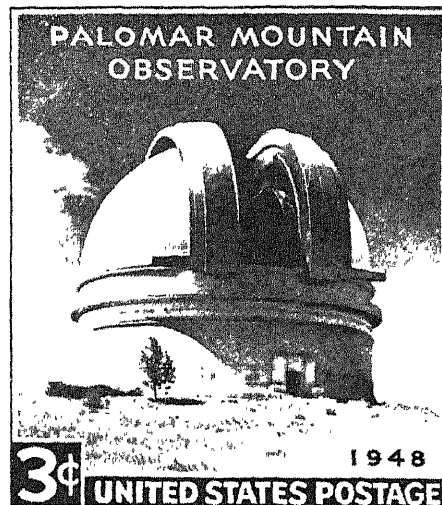
The radiologist said that the 249 incurable cancer patients in the series were treated after animal experiments showed the neutron beam from the cyclotron was highly destructive of cancer tissue, indicating that neutrons might help cancer victims who otherwise had no hope of survival.

A lack of any appreciable differentiation by neutrons on cancer and healthy tissue is given by Dr. Stone as the reason for the disappointing results.

Neutrons were effective in destroying cancer tissue, but Dr. Stone said that serious damaging after-effects also showed up some time after treatment. These after-effects were more severe than expected, there being no basis in either X-ray therapy or animal experimentation with neutrons to expect such after-effects.

The five-year survival rate of the incurable patients treated with neutrons was 7.5%. If left untreated, the rate would have been somewhat less than 5%.

Eighteen patients were kept alive for more than five years. All of these patients had severe late reactions, some of them so



PALOMAR COMMEMORATIVE STAMP—The central motif is an exterior view of the Palomar Mountain Observatory. It goes on first-day sale at Palomar Mountain, Calif., on Aug. 30. An initial printing order of 50,000,000 stamps has been authorized.

severe that the patients were partially incapacitated.

However, Dr. Stone added that experimental work should be continued to determine if there is some way the cancer-destroying power of neutrons can be eventually applied.

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CHEMISTRY

Plastic Containing Rubber Has Unique Qualities

➤ A LIGHT, hard, somewhat brittle resin, to which rubber has been added, has unique properties that make it suitable for use in football helmets, bowling balls and many industrial applications.

The new plastic, called tuf-lite and developed by the Goodyear Tire and Rubber Company, was announced to the American Chemical Society in Los Angeles, by H. R. Thies of the company's chemical division.

The raw materials for the new plastic are butadiene-styrene resins. These are plasticized with synthetic or natural rubber. The final product is at first soft and pliable, flowing readily. It molds cleanly, with little trimming necessary, and handles easily as long as it is kept warm.

The tuf-lite product is one of the toughest of the high-hardness rubbers, or plastics. It has high-impact resistance, low water-absorption, good tensile strength and excellent electrical properties. It is also readily machinable.

Science News Letter, July 31, 1948

PHYSICS-ASTRONOMY

Creation of Galaxies

It took a tenth of the present age of the universe for the galaxies to evolve into their present general shape, according to latest theory.

► WHEN the universe was a tenth as old as it is now, the great masses of stars called the galaxies (like our Milky Way) were formed.

It took that time, 300,000,000 years, from the beginning of things for the universe to evolve into the general shape that it now is.

This new view of the past life of the cosmos has been figured out by Dr. George Gamow, mathematical physicist of the George Washington University, Washington, D. C., author of "Biography of the Earth" and other books.

He has figured it out quite literally, for the formulae that he derives to express the size and mass of the galaxies are written in the simple and elemental terms of the properties of the elementary atomic nuclei (hearts of matter).

A few months ago Dr. Gamow joined in fixing the original temperature and density of the expanding universe when it was a few minutes old. In the beginning, all creation was a highly compressed gas made up of neutrons (now best known as the

trigger of atomic bomb fission). This gas (heavy as iron) started decaying into protons and electrons and building up the heavier chemical elements. The stuff of the universe was completely made in about one hour.

This probing into the origin of the universe is called by Dr. Gamow "alpha, beta, gamma" stuff because it was done by a team of R. A. Alpher, who got his Ph. D. for it, Dr. H. Bethe, the Cornell physicist famous for the atomic energy theory that keeps the sun stoked, and Dr. Gamow.

Now Dr. Gamow is following the expansion of the universe further. Starting with these initial conditions and the correct proportion of the various kinds of atoms that were "cooked" at the beginning, he finds that the size and mass of the great clouds of stars can be calculated from the initial conditions. And since the universe got into its essentially present shape, nine times as much time has elapsed as was necessary to create the galaxies.

"I am quite excited about these new

results on the evolution of the universe," Dr. Gamow told Science Service. "It seems to me to be the best piece of work I have done since the theory of radioactive decay 20 years ago."

Dr. Gamow is lecturing during the summer at Ohio State University. He got the idea for his new researches on the universe while visiting the giant telescopes on Mt. Palomar and Mt. Wilson, and he developed the new theory while riding back east on the Superchief.

In the complex formulae that show the relation between the microcosmos of the atomic nuclei and the macrocosmos of the stellar galaxies, Dr. Gamow uses the elementary charge, the quantum constant, the mass of the proton, the velocity of light, Newton's gravitational constant, and the binding energy of the deuteron. From these he derives the diameter of the stellar galaxies as 12,000 light years and the mass of the galaxies as 15,000,000 times that of the mass of the sun. This corresponds roughly with the dimensions and mass that the astronomers find for some of the galaxies, although the Milky Way in which we live is a giant and considerably larger.

A preliminary communication on his new theory has been sent by Dr. Gamow to the *Physical Review*, journal of the American Physical Society, and a longer account to *Nature* (London).

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ENTOMOLOGY

Red Dye Test Detects Wheat Weevil Infestation

► WEEVIL INFESTATION in wheat, long a cause of major grain and flour losses but extremely difficult to detect, can now be shown up very easily by means of a new test devised by J. C. Frankenfeld, U. S. Department of Agriculture entomologist. He simply soaks samples of suspected grain for a few minutes in a dye containing acid fuchsin, a coal-tar product long used in biological laboratories for staining microscope slides. Cherry-red dots appear on grains in which weevil eggs have been laid.

The test depends on the female weevil's method of laying her eggs. She gnaws a hole through the coat of the grain, deposits an egg in it, and seals it up with a plug of jelly-like material, which soon hardens and becomes so much like the grain in color that it is practically impossible to detect.

However, the hardened plug stains vividly red with the fuchsin dye, while the grain fails to take up the color. Thus the weevil's own device is turned against her offspring.

For the protection of the new wheat crop, the Department of Agriculture recommends thorough clean-up of bins and disposal of old grain, coating the walls with residual-type DDT or other persistent insecticide spray before filling, and fumigation of filled bins during August.

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The diameter of stellar galaxies:

$$D = \frac{2^{49/8} 5^{1/4} \pi^{7/4} e^2 h^{3/4} \epsilon^{15/4}}{3^{3/8} m^{29/4} c^{35/4} G^{5/4}} = 1.1 \cdot 10^{22} \text{ cm} = 12,000 \text{ light years.}$$

The mass of galaxies:

$$M = \frac{2^{43/8} 5^{7/4} \pi^{5/4} e h^{5/4} \epsilon^{5/4}}{3^{29/8} m^{15/4} c^{5/4} G^{7/4}} = 3 \cdot 10^{40} \text{ g} = 1.5 \cdot 10^7 \text{ sun masses.}$$

Here:

- e — is elementary charge
- h — is quantum constant
- m — is the mass of proton
- c — is the velocity of light
- G — is Newton's gravitational constant
- ε — is the binding energy of deuteron.

EVOLUTION OF UNIVERSE FORMULA—This shows the relation between the microcosmos of atomic nuclei and the macrocosmos of stellar galaxies as worked out by Dr. George Gamow, mathematical physicist of the George Washington University, Washington, D. C.

ASTRONOMY

Will Watch Minor Planets So They Won't Get Lost

➤ SAFEGUARDING the 1,500 or so minor planets that revolve around the sun between the orbits of Mars and Jupiter is one of the many problems to be considered at the meeting of the International Astronomical Union in Zurich, Aug. 11 to 18.

Most of these asteroids are so tiny that they can be distinguished from faint stars only by the fact that they move across the heavens. The majority of them are less than 50 miles across. They should be observed at least once every few years, because the paths they follow in space must be continually corrected to keep them from getting lost. Each minor planet will, in effect, be given a "guardian astronomer."

Plans will also be made to improve the study of variable stars. This project was originally assigned to the Germans, and later taken over by Russian astronomers.

About 40 astronomers from the United States are expected to attend the international astronomical meeting, the first general assembly to be held in a decade. Already some representatives from the United States are on their way, others plan to fly over early in August.

Six have been appointed voting delegates to represent the United States. Dr. Otto Struve, director of Yerkes Observatory of the University of Chicago, is chairman of the delegation. Others include: Dr. Dirk Brower, director of the Yale University Observatory; Dr. Hamilton M. Jeffers of the Lick Observatory, University of California; Dr. Edwin P. Hubble, Mount Wilson Observatory of the Carnegie Institution of Washington; Dr. Harlow Shapley, director of Harvard College Observatory; and Dr. Joel Stebbins, director of Washburn Observatory of the University of Wisconsin. Dr. W. S. Adams, director emeritus of Mount Wilson and vice president of the I. A. U., will not attend.

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ENGINEERING

Propose Allocating Costs Of Water Projects

➤ EACH of the various purposes served by water development projects, such as irrigation, flood control, navigation and power, can and should be made to bear their proper share in cost allocation, the American Society of Civil Engineers was told at a meeting in Seattle, by Col. F. W. Scheidenhelm.

The colonel is chairman of a special committee of the society participated in by four divisions of the organization: Irrigation, Power, Waterways and Engineering Economics. The plan of procedure recommended for allocating costs, which often involve millions of dollars of federal funds,

is for greater protection to taxpayers through disclosure of all subsidies. It is designed to help standardize the financial analysis of such huge projects as the Hoover, Grand Coulee, and Bonneville dams, and the system of dams of the Tennessee Valley Authority.

The plan proposed is necessarily complicated because of the complexities of the subject, but is based on what is called a "proportionate use of capacity." It distributes joint costs upon the basis of the comparative use of the joint facilities, leaving the way open for possible needed later adjustments.

Under present national law, costs incurred in flood control and navigation are charged almost entirely to the federal treasury and, hence, paid by the federal taxpayers. Costs incurred for irrigation are repayable in part by water users to the treasury, and costs for power development are intended to be repaid to the government in full. For this reason an equitable system of cost allotment is essential.

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METEOROLOGY-ENGINEERING

Wave Recorders Benefit Waterfront Structures

➤ WAVE RECORDERS at strategic locations on the Pacific coast will register wave characteristics and the information gained will be of benefit in erecting waterfront structures.

Some of these wave recorders have been in use for over a year, the American Society of Civil Engineers was told at a meeting in Seattle, by Prof. J. W. Johnson of the University of California. Records from the wave recorders also provide a means of checking the method of forecasting waves from weather charts, he stated.

Of the various recorders which have been developed by the University of California, all work on the method of recording pressure fluctuations at the sea bottom and transposing these values to surface wave height. The fundamental principle of the method is that surface waves induce pressure changes in the entire column of water between the surface and the sea bottom. The instrument consists of an underwater unit to pick up and convert pressure fluctuations into electrical impulses which are transmitted by cable to a chart recorder on shore.

The records not only give the wave characteristics which structures must be designed to withstand, he said, but also give knowledge of value in determining whether structures are economically justified in view of the frequency of occurrence of waves of damaging character.

Forecasting unusual waves and their probable heights is important in controlling marine and shore activities. The recorders have already proven themselves a valuable aid in these forecasts.

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ASTRONOMY

Faint Comet Discovered By California Astronomer

➤ A FAINT COMET has been discovered by C. A. Wirtanen of Lick Observatory of the University of California. Mr. Wirtanen found another faint comet about this time last year, and within the last 11 months has spotted two tiny minor planets.

The new comet is of the fifteenth magnitude and thus so faint you will not be able to see it without the aid of a powerful telescope. Located in the constellation of Equuleus, the colt, it is moving in the direction of the constellation of Aquila, the eagle.

Found on a plate taken the morning of July 15, the comet appears only as a small streak. At that time its right ascension was 21 hours, 13.7 minutes; its declination plus seven degrees, 55 minutes. It is moving slowly west and south, but to date its orbit has not been worked out.

Science News Letter, July 31, 1948

PHYSICS

Einstein Theory No Bar To Space Ship Navigation

➤ SUPPOSE you were in a space ship on the road to Mars. You had no radio connection with earth and your space ship had no windows. The only clue to your position that you could have would be a measurement of the forces acting on your ship. How would you find your way?

The solution to this riddle is demonstrated by John J. Gilvarry of North American Aviation, Inc., Los Angeles, in a report to the journal of the American Physical Society, *The Physical Review* (June 1).

It can be done if you happen to be a competent computer. If you know the pull of gravity at the point where you are, your centrifugal acceleration and the pull exerted on your ship by any rotating systems in the vicinity, you can figure out your position. The formulae used for doing this are the same type used in the instrument designed to fix the fuel cut-off point in the German V-2 rocket.

Einstein's equivalence principle has frequently been interpreted to imply that this riddle could not be solved. Mr. Gilvarry shows that this interpretation is wrong. What Einstein really means is that a pilot who had never been out of his space ship and who had never had a chance to measure gravity without being misled by the motion of the ship would be unable to solve this problem.

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E FIELDS

GENERAL SCIENCE

U. S. Army Medical Library Sends Books to Europe

➤ MORE THAN a thousand books on medicine to build up war-ravaged libraries of Europe have been distributed from the stocks of the United States Army Medical Library.

Belgium, China, France, Great Britain, Hungary, Poland and Yugoslavia have received this aid from the U. S.

Libraries to receive American books were selected by the United Nations Educational, Scientific and Cultural Organization. The International Clearing House for Publications in Paris, a branch of UNESCO which coordinates the world-wide exchange of literature and directs the dispatch of gift volumes from donor to receiving countries, has handled the distribution of the books.

Thousands of publications are funneled monthly through the UNESCO Clearing House to needy areas. Particular emphasis is placed on war-devastated countries in accordance with UNESCO's Reconstruction Program.

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CHEMISTRY

Plastic Wraps for Fruit Are Moisture-Resistant

➤ A NEW plastic wrapper for fruits, vegetables, tobacco and other products, thin as paper and transparent as cellophane, was described in Los Angeles to the American Chemical Society. The chemicals used in the plastic films are made entirely from petroleum, and the films owe their preservative properties moisture resistance.

The chemicals used are known as S-polymers. The films keep moisture in or out. In a test with the new wrapper, S-polymer-wrapped oranges lost only one-tenth their weight in a 28-week period, while unwrapped oranges had shrunk to less than half their original weight in the same period.

The report on the new wrapping material was presented by W. A. Fairclough of the Enjay Company, New York. Co-authors were Raymond G. Newberg and J. R. Briggs of Esso Laboratories, Linden, N. J.

Science News Letter, July 31, 1948

CHEMISTRY

Chemist Gets Award for Work on Guayule Rubber

➤ THE Charles Goodyear medal of the American Chemical Society was awarded to a retired chemist, Dr. David Spence,

Pacific Grove, for his work on guayule rubber, the only natural rubber commercially made in the United States.

The medal is a tribute to Charles Goodyear, credited with being the inventor of rubber vulcanizing. The Scotch-born Dr. Spence is honored for his contributions to the growth of the guayule shrub and the production of rubber from it. He is an outstanding authority on rubber chemistry.

Guayule, a native American plant, was one of the most promising sources of domestic natural rubber during the years when the foreign supply was cut off and before satisfactory synthetic rubber was being produced. Extensive plantings of the shrub were made in the Southwest and rubber was made from it. About two years is required to bring a guayule plant to the harvesting stage.

Other proposed sources of home-grown American rubber offered less promise. A Russian dandelion called kok-sagyz was proposed but its rubber yield is much less than that of the guayule shrub. There is rubber in various species of milkweeds, spurges and goldenrods, but the content is low and extraction is difficult.

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PHYSIOLOGY

Mammalian Hormone Now Proved Present in Hens

➤ A HORMONE or internal gland secretion known as progesterone, long supposed to be a monopoly of mammals, has now been proved to be present in hens by Dr. Richard Fraps, zoologist of the U. S. Department of Agriculture, who works at the great research center at Beltsville, Md., together with Drs. Charles Hooker and Thomas Forbes, of Yale University. Formal announcement of the discovery was made in *Science* (July 23).

In mammals, progesterone is responsible for the attachment of the first beginnings of the embryo to the maternal tissues that will nourish it and in time bring it to birth. Since nothing of this sort happens in birds, the role of progesterone in this great animal group is not altogether clear.

Dr. Fraps is inclined to think that the hormone may act as a kind of chemical trigger to two other hormones secreted by the pituitary, a small gland just under the brain. The release of these hormones in turn starts the egg on its career of formation and being laid. It may also have something to do with a substance in the egg white known as avidin, which has germicidal properties and thus protects the chick during its three weeks of helpless existence within the shell.

Existence of this supposedly "mammalian" hormone in the hen, and presumably in other birds as well, adds to the evidence that birds and mammals, unlike though they are, have a common ancestry somewhere back along the line.

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ENGINEERING

Rubber in Asphalt Makes Improved Road Surfacing

➤ RUBBER in asphalt is reported to make an improved road surfacing material. A 5% to 10% rubber powder mixture with asphalt gives a surface with longer life, more resistance to wear, and with better anti-skid properties, according to London authorities.

This is indicated in a recent report of the British Rubber Development Board. The conclusions of the board are based on its investigation of experimental stretches of rubber-asphalt roads in the Netherlands. Some of these stretches have now had a 10-year tryout. One, which had been subjected to very hard usage during the war years and on which little maintenance had been carried out, was in first-class condition when compared with adjacent stretches containing no rubber.

A Netherlands organization, together with an associated group in the Netherlands East Indies, carried out prewar research into the effects of the addition of small quantities of rubber on the properties of asphalt. It was found that the addition of from 5% to 10% of rubber powder affected the properties of the material when applied to roads in such a manner that penetration, resistance to impact, softening and lessening flow were particularly improved.

The reason for the improvement, according to the Rubber Development Board, is that the rubber powder slowly absorbs the light constituents of the asphalt, rendering it elastic and reducing its tendency to flow. Heat penetration seems also to be reduced. The rubber-asphalt roads are reported to be less soft in summer and less hard in winter than the asphalt roads without the rubber powder.

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BIOCHEMISTRY

Chemical from Fungus Halts Spread of Fungi

➤ A CHEMICAL called trichothecin, which is produced by a fungus itself, has the power to stop the spread of other fungi. It does this by preventing the fungi from reproducing.

Trichothecin has been extracted from the fungus species known as *Trichothecium roseum* by G. G. Freeman and R. I. Morrison of the Imperial Chemical Industries' Research Department in Ayrshire, England. They report their findings in a letter to the journal, *Nature* (July 3).

Full accounts of the chemical and biological properties of trichothecin are being prepared by the scientists. They may show that trichothecin will be a useful weapon in the war against fungus-caused diseases which affect both animals and plants.

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ENGINEERING

Saving on New Housing

Many authorities believe that cutting costs depends upon simplification and standardization of parts plus the application of mechanized methods on the job.

By A. C. MONAHAN

► IF YOU ARE going to build a small house for your family now in spite of present high costs, there are small savings that can be made which still give a satisfactory building.

Not much can be saved, it is true, but every dollar counts. Real reduction in building costs will come only with fundamental changes in the building industry. These changes will reach deeply into state and municipal building codes, and into practices of architects, supply manufacturers and distributors, contractors and labor. All share a part in the situation that makes houses cost so much at the present time.

The fundamental changes can not be made in a day or year. For that reason many studies have been made to find ways and means of cutting costs with them unchanged by simplified procedures, standardization of materials in quality and dimensions, and use of factory-built parts, and the use of power tools to replace hand methods.

Standard Parts

Among valuable suggestions of immediate application in home-building are those of the U. S. Housing and Home Finance Agency and of the National Retail Lumber Dealers Association. Others of value are issued by the housing division of the University of Illinois and similar institutions in other states. The use of standard parts seems to be a keynote in all.

Standardized parts, as the term is most widely understood in construction, are standard in dimensions. Under the so-called modular system, all measurements are based on four-inch multiples. Since many coordinated products, such as panel, windows and doors, are now available, houses may be designed with standard parts that need little if any cutting and fitting. This means a real saving in labor costs.

The suggestions of the National Retail Lumber Dealers Association for small houses include:

Modular design coordinating materials using a four-inch multiple.

Adoption of a four-foot planning multiple for lengths, width and height of rooms and interiors.

Use of 16-foot unsupported spans where possible.

Application of finished floor and ceiling material, where feasible, before erection of interior partitions.

Use of pre-cut and pre-assembled materials, particularly in closets and storage walls, partitions, and roof trusses, where practicable.

Use of plumbing wall or shortest plumbing and heating lines possible with proper functioning.

Use of basic home designs subject to easy changes of appearance through positioning on the lot, minor additions, and decorative treatment.

To illustrate the principles recommended by the National Retail Lumber Dealers Association, the organization designed plans for a standard housing unit. It is a one-story affair, 16 feet wide and 24 or 28 feet long. Two units can be used if desired, either in L-shape, or one over the other to give a two-story house

Model House

The 16-foot width for this model house was selected because it is the greatest space that can be safely spanned by two-by-ten-inch floor joists supported only at the two ends. This width also permits the use of a very simple tied-rafter type of roof truss, readily assembled on the floor and easily lifted into place by two men.

The 24- or 28-foot length was selected because they are convenient multiples of standard 4-foot factory-built wallboard and outside covering. These lengths also permit equal spacing of joists and studs placed

either 16 or 24 inches from center to center

The inside partitions in this house are not erected until the finished floor is down and the ceiling completed. They bear no weight but their own. Laying the top flooring before the partitions are erected means real economy in labor by saving time usually taken in cutting floor boards to fit to partitions and the doors in them. Further economy is secured in this house by placing the bathroom adjacent to the kitchen, so that all plumbing is in one wall.

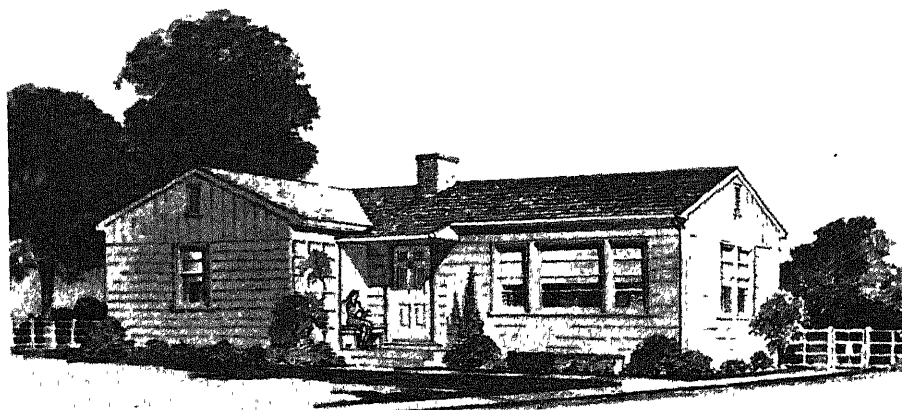
Houses for Veterans

The U. S. Housing and Home Finance Agency has been particularly concerned with low-cost houses for veterans and has prepared bulletins with valuable suggestions. For young couples without family, it recommends an expansible house. This is a building so designed that additions may be made later at the least cost and without destroying its beauty.

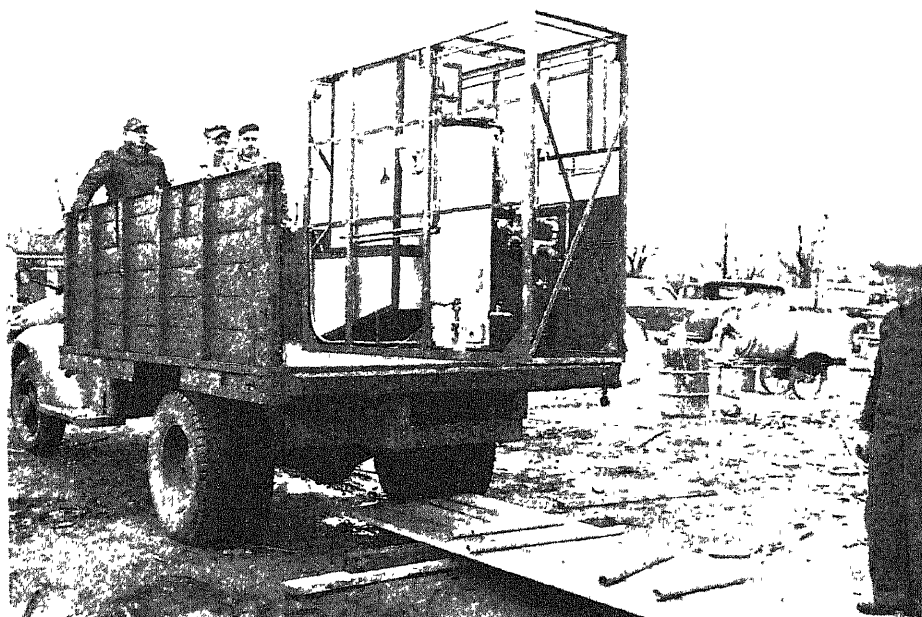
One of its original houses is a rectangular affair with kitchen, living room, one bedroom, bath and alcove. It can be lengthened, or enlarged with wings. Converting a window or two into inside doors, and roof attachments, are about all the changes necessary in the original structure when the additions are made.

Other publications of this government office cover such subjects as lower costs through better codes, insulation of concrete floors, earth constructions and planning the house. A particularly interesting suggestion is the use of wood roof trusses for small dwellings.

Definite savings in materials and labor requirements through use of preassembled



L-SHAPED HOUSE—It is made of two standard units suggested by the National Retail Lumber Dealers Association.



UTILITY UNIT—A factory-built Ingersoll utility unit core has furnace, hot water heater, and plumbing to which kitchen, laundry and bathroom fixtures, a part of the unit, are attached.

wood roof trusses make truss framing an effective means of cost reduction in small dwelling construction, the agency states. In a 26-by-32 house, the use of trusses can result in a cost saving of approximately \$70.00, and a reduction in use of lumber of almost 30% as compared to conventional rafter and joist construction.

With pre-assembled trusses a roof can be put over the job quickly to provide protection against the weather, and also they permit the use of non-bearing partitions giving flexibility in interior arrangements.

The construction industry as a whole is big business but in operation it is made up of widely separated individual small activities. House construction is a local industry; few contractors of dwelling units operate anywhere but in their local areas.

So long as the single house, separately planned and constructed one or a few at a time, remains the unit of production in the building industry, little cut in costs may be expected. This is particularly true as long as builders are called upon to cut, fit and assemble the numerous parts of a house on the site and by separate workers of various trades.

Those who have studied the present situation seem to believe that progress depends primarily upon simplification and standardization of parts, the use of factory-built sub-assemblies, and the greater use of machine tools and mechanized methods on the job.

Municipal building codes are blamed by many, including the U. S. Housing and Home Finance Agency, for much of the

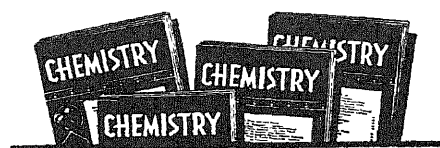
unnecessary high costs of present housing. These codes, almost every city has one, are based on old-time construction practices and old-time materials. They fail to take into consideration newer building materials thinner and lighter in weight that have equal strength with old materials. Many of them prohibit the erection of factory-built complete houses, the so-called pre-fabricated type, because they lack the required wall thickness.

In studies of the high cost of building, many find labor partly to blame. There are restrictive actions on the part of labor organizations which result in increased cost. These include labor agreements which require that certain kinds of work belong to certain labor unions, and no others may touch. The result is the employment of more craftsmen and foremen than otherwise would be employed.

Then there are labor restrictions that discourage or prevent the erection of pre-fabricated houses or parts that would lessen hand work on the job. Also there are regulations relative to the number of bricks a workman may lay in a day, the width of the paint brush he may use, and the number of apprentices that may be trained.

Labor alone is not to blame for present high costs, however. Government regulations, manufacturers and distributors of materials, and contractors all must share blame. The elimination of restrictive practices that reduce genuine competition among supply dealers and contractors is one step suggested to help greatly in cutting the cost of home-building.

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An up-to-the-minute periodic table of chemical elements, both Mendeleeff and Bohr arrangements, has been compiled. Accept special offer of 11 months for \$1.90 and receive chart, 15 x 10¼ inches, as a bonus.

SCIENCE SERVICE
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Do You Know?

Australian football and Irish football are somewhat alike, but the Australian game is played with an oval ball on an oval field and the Irish game with a round ball on a square field.

Ocean ice is classed as field ice, growlers and icebergs; the first is pack ice of shallow draft, the second are low-lying pieces of glacier ice not as large as bergs, and icebergs are large floating masses four-fifths under water.

One characteristic of *birds* is the dominance of vision over other senses.

The so-called *barking frog* found in Texas has a remarkable call that somewhat resembles the barking of a dog.

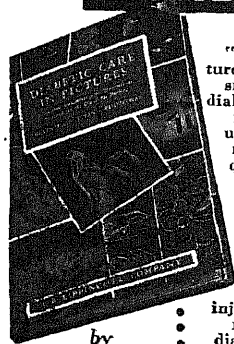
Air within a tube, if reduced to a very low pressure, can be made to glow by passing a high-voltage electrical discharge through it.

Cuba, Illinois-size, has some 80 species and 16 varieties of *palms*.

Sulfur is one of the four principal basic raw materials in chemical manufacture.

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GENERAL SCIENCE

Await Foundation Bill

► NOW THAT Congress has reconvened, scientists, educators and military leaders are hoping that the nation can at last have a strong civilian peacetime organization for directing federal support of science—a National Science Foundation.

Rep. Charles A. Wolverton, Rep., N. J., told Science Service that he, too, hopes Congress can now complete action on a bill establishing the Foundation. Rep. Wolverton, chairman of the House Committee on Interstate and Foreign Commerce, introduced a science foundation bill at the same time that an identical one was put in the Senate hopper by Sen. H. Alexander Smith, Rep., N. J., for a bi-partisan group of senators. The Senate passed by voice vote a slightly amended bill early in May. But the House version came out of committee late in the session and failed to get unanimous consent. When Congress adjourned, the bill had not come up for debate on the floor of the House yet.

Now, its supporters, including the Inter-Society Committee for a National Science Foundation which represents many scientific and educational groups, will be pushing for action on the bill which needs only action by the Rules Committee to bring it to the floor of the House.

President Truman's recall of Congress gives another breath of life to the long-

awaited Foundation. Envisioned originally by Dr. Vannevar Bush as a peacetime successor to the Office of Scientific Research and Development which he headed in World War II, the Foundation has had a hectic legislative history. It has been discussed by witnesses at Congressional hearings since the war ended. A bill passed the Senate in the seventy-ninth Congress, and both houses a year ago when President Truman killed it by a pocket veto.

The present bills—the one which passed the Senate and the one which is before the House—differ only in detail. Both are believed to be satisfactory to the Administration. In fact, no one seems to oppose actively the Foundation. But this has been generally true for some time and there is still no Foundation.

If the House passes the bill, it will probably be sent into a conference to iron out differences in the two pieces of legislation. Then, the bill would go to the White House.

A National Science Foundation would probably be cheered in many quarters. In addition to the scientists, who have favored such legislation all along, the military would heave a sigh of relief. The Armed Forces have been carrying much of the burden of government support to science since the war.

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ARCHAEOLOGY

Copy Asiatic Inscription

► THE first complete copy of an ancient inscription carved more than 2,400 years ago on the walls of Mount Behistun in Iran will be made by a group of American archaeologists this summer.

This inscription is called "The Rosetta Stone of Western Asia" after the original "Rosetta Stone" found on the Nile which held the key to Egyptian hieroglyphics. The inscription on Mount Behistun has shown scholars how to translate ancient cuneiform writing.

The expedition is sponsored by the University of Michigan and the American Schools of Oriental Research and is under the direction of Prof. George G. Cameron of the Oriental Institute of the University of Chicago.

The inscription the expedition will study is one of the most famous in Western Asia. Cut into the rocks by the order of Darius, King of Persia, it contains a relief showing Darius and 10 of his enemies whom he subdued. Underneath the relief are eight columns of cuneiform writing, telling how Darius outwitted his enemies, and, with the aid of his god Auramazda, became king over Persia. This, it is explained, was be-

cause he was "neither a liar nor an evil-doer, neither I nor any of my family."

The story is told in three languages which were current 2,500 years ago. These are: Elamite, which is mentioned in the Biblical book of Esther; old Persian, Darius' own tongue; and Babylonian. By comparing these different versions of the same story, modern scholars have found the key to cuneiform.

The expedition plans to re-examine all the doubtful passages in these inscriptions and also to study four additional columns of inscriptions which have never been read because they are inaccessible from the ground. In order to reach these columns the archaeologists will lower a scaffolding from a natural shelf, 300 feet above the inscriptions.

To copy and photograph the main part of the inscription which is carved 500 feet above a plain, the expedition will use standard mountain-climbing equipment and a skyscraper scaffolding.

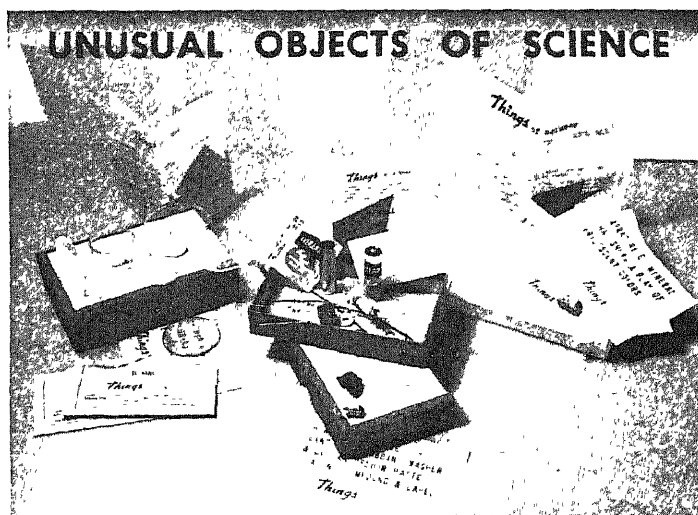
The members of the expedition are leaving for Iran at the end of July. They hope to complete their work and return to this country in the early part of next year.

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B COLOR COLLECTION

Paints that glow in the dark; red and green plastic sheets that together cut out all light; brilliant dyes obtained from plant roots—these and many other intriguing specimens are contained in the PHOSPHORESCENCE, PLASTIC PILOT AIDS and VEGETABLE DYES UNITS which make this colorful collection. There are fourteen specimens in all, including blind flying sheeting in red and green, dimout blue sheeting, ultra violet transmitting sheeting, phosphorescence plastic, tape, pigment, paint, madder, indigo, tumeric and alum.

C MINERAL COLLECTION

Stones showing the original structure of trees that grew millions of years ago; vacuum tube insulator made from one of the softest known minerals; rock containing traces of native sulfur—these are the surprising subjects in the PETRIFIED WOOD, TALC and SULFUR UNITS making up this collection. In the three boxes there are seventeen specimens, including petrified sweetgum, redwood, oak, elm and bog, fired and natural talc, sulfur-bearing limestone, iron sulfide, zinc sulfide, crude sulfur and flowers of sulfur.

D UNUSUAL MATERIALS COLLECTION

Porous cushioning material for upholstery; glass-enclosed air cells used to keep out heat or cold; zinc made fine-grained by incorporation of only 0.05% lithium—these materials of industrial importance are contained in the HOUSING, HOME AND OFFICE and LITHIUM UNITS. The eighteen specimens contained in these three blue boxes include wood-fiber wallboard, plywood, glass fiber fabric, coffee measure, airfoam, plastic and wire screening, shaver head, natural spodumene, lithium chloride, lithium nitride, pure zinc, zinc and lithium master alloy, and lithium-treated zinc.

E FIBER COLLECTION

Synthetic fiber made from skim milk; twisted rayon cord used in auto tires; glass fibers less than three ten-thousandths of an inch in diameter—these are the interesting subjects of the CASEIN, RAYON and GLASS FIBER UNITS that will be sent to those selecting this collection. In the three boxes that make up this series of exhibits there are fifteen specimens, including casein powder, raw fiber spun from casein, aralac, soft glass fiber, cotton linters, chemical cotton pulp, rayon tire cord and rayon fabric lining material.

F PLASTIC COLLECTION

Film with a seam that is stronger than the plastic itself; plastic plate with which you can print a bit of illustration or writing; plastic-coated yarn for crocheting or braiding a design—these are the rewarding specimens contained in VINYL PLASTIC FILM, PLASTICS IN PRINTING and PLASTIC COATED YARN UNITS which comprise this unusual scientific collection. There are 20 specimens, including vinyl plastic film, heat sealed seam, spot welded ruffle, plating printing plate, moisture-proof sheeting, twist leaflet binding, plastic-coated yarn, flame-retardant webbing and fine fabric.

G TEXTILE COLLECTION

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GENERAL SCIENCE

Election Forecast Made

A Republican President with a Democratic Congress is seen as a possibility. Wallace's third party not likely to be determining factor, veteran predictor says.

➤ THAT the elections this fall may very possibly give us a Republican President and a Democratic Congress is the suggestion made by a veteran predictor of elections, Louis H. Bean, economic adviser to the Secretary of Agriculture, in a new book, *"How to Predict Elections"* (Knopf).

There is, Mr. Bean has found from a study of votes for Congress and for President during the past hundred years, a regular tide of ups and downs in party popularity. If the political tide follows the same course that it has in previous years, the 1948 elections may very well mark an upward swing for the Democratic Party from the low of the 1946 Congressional elections, when the Democrats actually lost more votes than they might have been expected to on the basis of past history.

Wallace's new third party is not likely to be a determining factor in the coming election, it would seem from Mr. Bean's figures. A third party is seldom strong enough in the first year after its organization to draw as much as a fourth or a fifth of the total vote.

Theodore Roosevelt's Progressive Party was the strongest vote-getter on record, but it polled only 27.4% of the total vote. Although he is generally credited with taking enough Republican votes away from the fold to elect Wilson, Mr. Bean's figures indicate that this is giving too much credit to the Bull Moosers.

"In 1912," says Mr. Bean, "the political tide was running strongly liberal, progressive and Democratic and, in spite of the general belief, it appears that the Democrats had sufficient strength to elect Wilson had there been no third party."

The case was similar in 1924 when La Follette was taking votes away from the Democrats.

"In 1924 the political tide was running so strongly Republican that the Republicans would have won even if La Follette had not diverted nearly 5,000,000 votes from the Democrats."

No prediction is made by Mr. Bean (publicly, at least) as to how many votes will be carried off by Mr. Wallace or what the actual election result will be. But he does give a hint of where the third party strength may be expected. Some states, he has observed, have a political flexibility; others lack it. Even when the nation's vote changes as much as 10 points one way or the other, New Hampshire would change only 4 points. North Dakota, on the other hand, shifted 19 points. Wallace can look for his strength in the Northwestern states having the greatest political flexibility, and

least in the relatively stable states.

The carrying of certain states, with their important electoral votes, has a certain relation to the strength of the popular vote, Mr. Bean has found. This is the order in

ARCHAEOLOGY

Violence in Ancient Sinai

➤ BLOODSHED in the tension-zone between the Holy Land and Egypt is no new thing under the sun. Ages before the present fighting, even before the Children of Israel saw the pursuing chariots of Pharaoh overwhelmed, there were red stains on the sands of Sinai.

Evidences of battle and sudden death a hundred thousand years ago, at er-Rawafi in Sinai, near the boundary of Palestine, were described by Dr. Henry Field, newly returned from field work with the University of California African Expedition. Dr. Field spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over stations of the Columbia Broadcasting System.

On the sides of a low hill in the desert, members of the expedition found large numbers of primitive hand-axes made of a yellowish-white stone, "in almost mint condition." They were of the type known as Mousterian, which were used by early Old Stone Age men, of the Neandertal level of development.

"As we reconstructed it," Dr. Field related, "the prehistoric flint-knapper and his friends must have been killed by a sudden attack or were driven from this sheltered spot overlooking some water pools, never to return. . . Hand-to-hand conflict in this part of the world is obviously not merely of our time."

The expedition crossed the Wilderness of Zin, through which Moses led the Israelites after they had escaped from Egyptian bondage. They saw very few signs of life, either ancient or modern, and hardly any animals, until suddenly they saw a ship—they had arrived at the Suez Canal.

"How the Israelites or anyone else could survive for long in that desert remains a mystery," commented Dr. Field.

Researches on the geography of Sinai convinced members of the expedition that the hosts of Pharaoh pursuing the Children of Israel met their end not in the Red Sea but in a great swamp called the Sea of Reeds.

As Dr. Fields reconstructed the event: "Moses and the Israelites were held as

which states may be expected to join the Democratic ranks if the popular vote should climb above 50%.

At 51%, Idaho. At 52%, Washington, Ohio, Delaware and Colorado. At 53%, Wyoming, Wisconsin, North Dakota, Nebraska and California. If these latter are all won, victory for the Democrats would be sure.

"If the Democrats made sure of Ohio and California," Mr. Bean predicts, "they might barely win. But if they reach into the 54% level and take New Jersey or New York, victory would be more certain."

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slaves at Rameses, later Tanis. Moses felt the approach of a great storm. That evening he led the Israelites eastward across the Sea of Reeds, later called the Reed Sea, and then misinterpreted as the Red Sea in our Bible.

"The Egyptians followed, with their heavy chariots, which became mired. They removed the wheels as described in Exodus, but that did not help. Then the storm broke over the Sea of Reeds. Moses and the Israelites had crossed to dry land. They had escaped. The miracle was complete."

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METEOROLOGY

20-Year Period Shows Cut In Hurricane Life Loss

➤ LOSS OF LIFE in hurricanes in this country has been cut to one-fortieth of its former magnitude in the past 20 years, thanks to better warning services and preparedness against disaster, states Howard C. Sumner of the U. S. Weather Bureau.

Mr. Sumner's figures are not absolute, but are measured by the amount of property damage. Much of the property exposed to hurricane damage, such as docks, warehouses, bridges, field crops and orchards, cannot be moved out of harm's way; but human beings can get to high ground and other secure places if they are told far enough in advance what is coming. Thus it has come to pass that for every ten million dollars' worth of storm-ruined property in the five-year period 1941-45 only four persons lost their lives, whereas in the 1926-30 period the comparable figure was 161.

The Weather Bureau does not claim all the credit for this improvement, it is emphasized. Red Cross disaster relief, Army and Navy air reconnaissance, both professional and "ham" radio stations, the press, telephone and telegraph companies, and alert private citizens have all contributed towards the vast improvement in the life-saving record.

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Books of the Week

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ANGORA RABBIT WOOL PRODUCTION—Thora M. Plitt Hardy and Ethel H. Dolnick—*Govt. Printing Office*, 22 p., illus., paper, 10 cents. Reports of investigations at Beltsville.

BASIC FISH COOKERY—Rose G. Kerr—*Fish and Wildlife Service*, 26 p., illus., free upon request to the Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C. Clear photographs show how to clean and prepare fish in appetizing ways that will probably be new to you.

CHEMISTRY: A History of the Chemistry Components of the National Defense Research Committee, 1940-1946—W. A. Noyes, Jr., Ed.—*Little-Brown*, 524 p., illus., \$6.00. The story of chemistry in the war includes the dramatic chapter of explosives, gas warfare, the more soothing story of insecticides and repellents, flame throwers, antifouling paints and mold prevention.

DIRECTORY OF ACTIVITIES OF THE BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, 1947—*Govt. Printing Office*, 157 p., paper, 30 cents. A very interesting summary of all the researches now under way with a list of the personnel engaged in them.

EATING FOR HEALTH—Pearl Lewis—*Macmillan*, 119 p., illus., \$2.25. A practical book for use in meal planning and preparation.

ELEMENTARY INDUSTRIAL ELECTRONICS—William R. Wellman—*Van Nostrand*, 371 p., illus., \$3.20. A book for students and workers in the electrical and plant maintenance fields.

ESSENTIALS OF PUBLIC HEALTH—William P. Shepard, Charles Edward Smith, Rodney Rau Beard, and Leon Benedict Reynolds—*Lippincott*, 600 p., illus., \$5.00. A condensed handbook for the physician in private practice or the medical student.

THE FIRST 25 YEARS OF THE NAVAL RESEARCH LABORATORY—A. Hoyt Taylor—*Navy De-*

partment, 75 p., illus., paper, limited number free upon request to the U. S. Naval Research Laboratory, Washington 25, D. C. The story of the birthplace of many modern instruments of war.

INFLUENCE OF PARTICLE SIZE IN DUST EXPOSURE—Theodore Hatch and W. C. L. Hemeon—*Industrial Hygiene Foundation*, 8 p., paper, free upon request to the Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa.

LIFE HISTORIES OF NORTH AMERICAN NUT-HATCHES, WRENS, THRASHERS AND THEIR ALLIES—Arthur Cleveland Bent—*Govt. Printing Office*, 475 p., illus., paper, \$1.75. The sixteenth in a series of the life history of North American birds prepared by the United States National Museum.

MINING GEOLOGY—Hugh Exton McKinstry and others—*Prentice-Hall*, 680 p., illus., \$10.00. Gathering together from its scattered sources in human minds and the literature much of the lore, the "art" or the common knowledge of the profession.

SIERRA POPOLUCA SPEECH—Mary L. Foster and George M. Foster—*Govt. Printing Office*, 45 p., paper, 40 cents. A project of the Interdepartmental Committee on Scientific and Cultural Cooperation. Describing the language of four small groups of Indians of Mexico

UNDERSTANDING SCIENCE—William H. Crouse—*McGraw-Hill*, 190 p., illus., \$2.20. Important modern developments explained for high-school students and the general reader.

X-RAY DIFFRACTION ANALYSIS OF CRYSTALLINE DUSTS—Harold P. Klug, Leroy Alexander and Elizabeth Kummer—*Industrial Hygiene Foundation*, 6 p., paper, free upon request to the Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa
Science News Letter, July 31, 1948

Captured German documents indicate that the Germans were starting cancer research along ultrasonic lines before V-E day. The Soviet and Japanese scientists have also published some reports of similar studies.

Ultrasonic apparatus is now being constructed on the campus of the University of Washington, with war surplus radar and sonar equipment. Sonar equipment, used during the war to detect submarines, employs ultrasonic waves which will echo from the sides of water-submerged vessels. The cancer-fighting apparatus is expected to have greater frequency ranges than any other in the nation.

Dr. Carlson said that the equipment will also be used to study the effects of ultrasonics on the central nervous system and in experiments in biology and physics.

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AERONAUTICS

Jets To Conduct Maneuvers Over Continental Europe

See Front Cover

➤ SIXTY-TWO U. S. Air Force jet fighting planes, which are to conduct maneuvers over central Europe, are shown on the cover of this week's SCIENCE NEWS LETTER in a practice flight in formation over the Caribbean Sea before being shipped by aircraft carrier to Scotland.

They are the famous fast Lockheed Shooting Stars, F-80Bs in military parlance. They are manned by the Air Force 36th Fighter Wing, which before departure was located in the Panama Canal Zone. The picture shows what is probably the largest group of jet fighters ever photographed.

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MEDICINE-PHYSICS

Ultrasonics Fight Cancer

➤ DISINTEGRATING BEAMS of high frequency sound waves will be focussed on deadly cancer cells in a new attack on this dread disease.

University of Washington scientists, physicists, electrical engineers, physiologists, and pathologists will join in a combined effort under Dr. Loren D. Carlson, assistant dean of the School of Medicine, in conducting the investigation of this method of fighting cancer. This research has been made possible by funds from a \$25,000 grant by the Damon Runyon Memorial for cancer research.

Ultrasonic rays of high frequency sound waves whose wavelength is too short to be heard by human ears are expected to be superior to X-rays in treating cancer in that they can be focussed on a small point and do not spread over a larger area,

attacking harmless cells.

Ultrasonic apparatus can launch an attack on cancer cells on three fronts. Cells will die from the heat caused by the friction of the rays passing through them. Chemical reactions within the cells may be speeded up by the rays and cause the cells to destroy themselves. Cancer cells, it is expected, will also be destroyed by ray-induced cavitation in which bubbles form in the cells and kill them.

Six years ago the possibility of killing cancer cells with ultrasonic sound waves was investigated by Drs. John C. Krantz, Jr., and Francis F. Beck at the University of Maryland. This research was held back by the fact that not until three years later was a method found of focussing the ultrasonic rays so that they would not harm normal tissue.

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• New Machines and Gadgets •

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⚙️ **TOOTHPASTE DISPENSER**, usable for other materials that come in flexible tubes, is a plastic box with a hinged cover and a threaded hole in one end. When the cap of the toothpaste tube is removed, the tube outlet is screwed into the hole; pressure on the tube ejects the paste through the opening.

Science News Letter, July 31, 1948

⚙️ **NIGHT-GLOWING** push bar for doorbells is composed of a luminescent pigment molded into a plastic bar where rain or fingers can not remove it. The bar, set in a solid brass body variously finished, absorbs light during the day and gives it off for hours after dark.

Science News Letter, July 31, 1948

⚙️ **TELEPHONE AID** for busy offices is a small cabinet that sits on a desk in which both ends of the ordinary telephone handset rest at all times. When the telephone rings, it remains untouched, but a switch on the cabinet is thrown and conversation is carried on in ordinary tones while the user sits in his usual position.

Science News Letter, July 31, 1948

⚙️ **SUN-GLASS LENSES** that permit the wearer to look straight at the sun without



discomfort or at ground-level objects without obscured vision, are coated with a nickel-chromium-ion alloy applied by an evaporation process. The coating, which varies from very light at the bottom to heavier at the top, makes mirrors of the

lenses, as shown in the picture, when viewed from the front.

Science News Letter, July 31, 1948

⚙️ **FREQUENCY COUNTER** for radio waves is a device which provides a simple means of measuring frequencies from zero to 1.6 megacycles, with accuracies claimed to be one part in 10 million or greater. The basic units of the instrument are two electronic counters, a crystal oscillator and an electronic switch.

Science News Letter, July 31, 1948

⚙️ **FLASHLIGHT CASE**, which glows in the dark, is easily found by the sleeper suddenly awakened during the night. The flashlight itself is similar to familiar types, but its ivory-colored case has a phosphorescent material baked onto the solid drawn-brass housing.

Science News Letter, July 31, 1948

⚙️ **FLUORESCENT PICTURES**, on the walls of at least one night club and one suburban home, are invisible as pictures in ordinary light but show brightly when flooded with invisible ultraviolet radiation, much of which they convert to visible light to illuminate the room.

Science News Letter, July 31, 1948

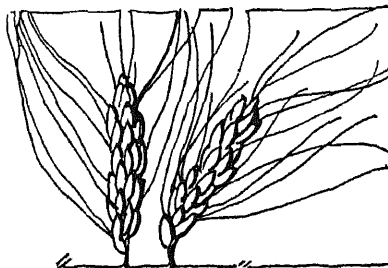
• Nature Ramblings by Frank Thone •

➤ ACCORDING to the fifth chapter of the Book of Genesis, Cain slew his younger brother Abel because Abel's sacrifice of a lamb had proved acceptable whereas his own had been rejected. That would make this primal murder a purely personal matter between the two men, and over a religious jealousy at that.

Back of the rather curt Biblical account, however, there is a deeper symbolism. If the quarrel between the brothers did not actually start with a dispute over their respective land-use rights it would be strange, for Cain was a tiller of the soil and Abel was a shepherd. And between followers of those two ways of life there has always been tension and bickering, and sometimes bloody war.

We have seen it in our own country, when farmers began to buy and fence off rangelands in the West, to the fierce resentment of stockmen who had long pastured their animals on free grass. There was

Cain and Abel



much snarling and some shooting before the matter was settled. This quarrel left one curious monument in a word: "sodbuster" became the plainsman's term of contempt for a farmer, and by transfer became also the old Regular Army man's epithet for any civilian.

Back through the ages this contest between the settled farmer and the nomadic

herdsman seems to have gone on in all lands. The farmer pushed his cultivation as far as the land would reward him; the herdsman found fenced fields and irrigation ditches very much in his way. Earliest overthrows of ancient civilizations in Mesopotamia seem to have been, at base, great raids by upland, stockraising nomads against lowland husbandmen who practiced intensive agriculture and thereby amassed coveted wealth. Then the raiders settled on the conquered acres, becoming farmers themselves—and eventually victims of the next incursion of still-nomadic warrior-herdsmen.

Eventually in some lands a balance was reached, with the better fields tilled and the stonier uplands used for grazing. That is the picture we get of Palestine in later Bible times: sheep and cattle were prized, but so were grain-fields, vineyards and olive groves. Parables of the shepherd and of the sower and reaper were alike "understood of the people."

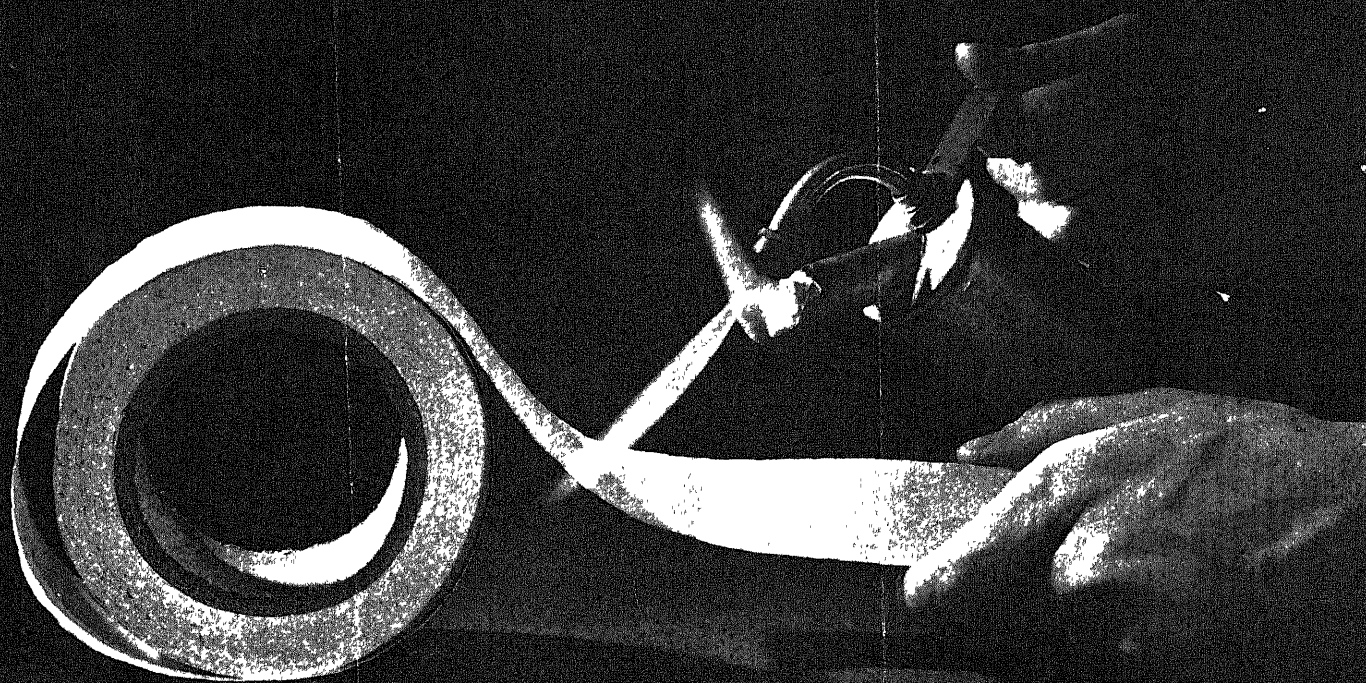
Science News Letter, July 31, 1948

AUGUST 7, 1948

4 OCT 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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New Delhi.

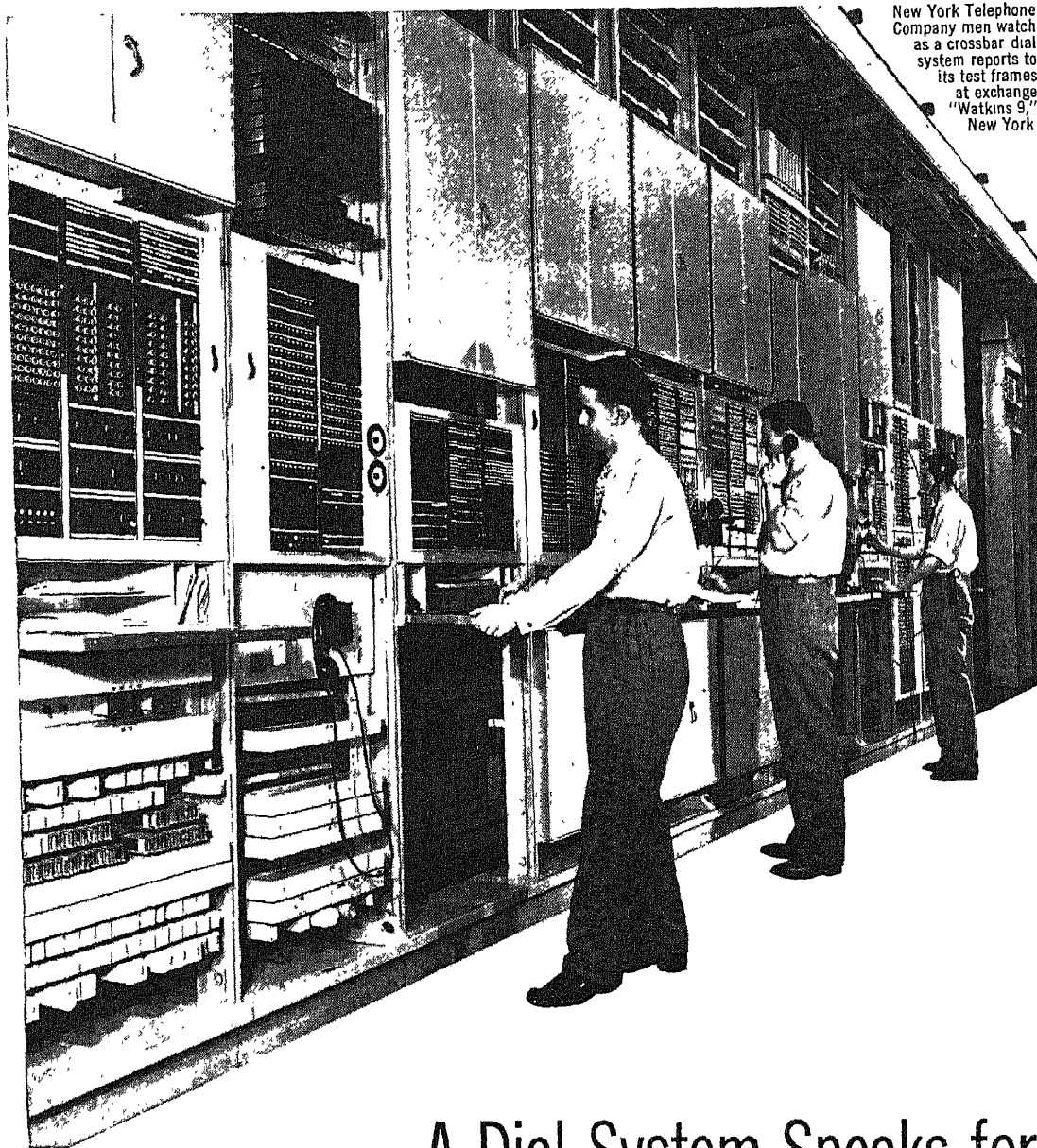
Hot Insulation

See Page 83

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VOL. 54 NO. 6



New York Telephone Company men watch as a crossbar dial system reports to its test frames at exchange "Watkins 9," New York

A Dial System Speaks for Itself

As dial systems have been improved, so also have the means of keeping them at top efficiency. Even before trouble appears, test frames, developed in Bell Telephone Laboratories, are constantly at work sending trial calls along the telephone highways. Flashing lamps report anything that has gone wrong, and the fault is quickly located and cleared.

If trouble prevents one of the highways from completing your call, another is

selected at once so that your call can go through without delay. Then on the test frames lights flash up telling which highway was defective and on what section of that highway the trouble occurred.

Whenever Bell Laboratories designs a new telephone system, plans are made for its maintenance, test equipment is designed, and key personnel trained. Thus foresight keeps your Bell telephone system in apple-pie order.



BELL TELEPHONE LABORATORIES EXPLORING AND INVENTING, DEVISING
AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

PHYSICS

Heavy Nuclei Hit Earth

Evidence that there are high-powered and massive particles in cosmic radiation that bombard the earth from outer space has been gathered.

► THE EARTH is being bombarded from outer space with heavy-weight projectiles. The cosmic radiation at about 20 miles over your head includes atomic heavy-weights, not just light-weights, such as the hearts of hydrogen and helium atoms.

Evidence that there are heavy nuclei in cosmic radiation has been gathered in the Office of Naval Research project called "Skyhook" during which balloons carrying recorders have been sent above the roof of the atmosphere.

Atomic debris or "cinders of creation" are being rained upon the earth in much the same way that shooting stars are remnants of past planets.

Tracks of heavy particles were captured when physicists of the University of Minnesota and the University of Rochester sent cloud chambers and special photographic plates aloft in free balloons.

The clues left in these radiation recorders are evidence for hearts of heavy atoms, the heaviest as massive as hafnium (mass 180 times that of hydrogen and

number 72 among the 96 known elements). The tracks are many times denser and heavier than those obtained from fragments produced in nuclear explosions.

This is rated as the most exciting discovery in cosmic rays of the year. The radiation has tremendous energies.

At two meetings in Pasadena, Calif., and Madison, Wis., the Rochester and Minnesota physicists have made preliminary reports and the *Physical Review* (July 15) carries their first published report. In the University of Minnesota group are Drs. F. Oppenheimer, E. P. Ney, E. J. Lofgren and Phyllis Freier, while the University of Rochester group includes Drs. H. L. Bradt and B. Peters.

Where are such high-powered and massive particles born out in the universe? A favorite idea is that they consist of the trash or debris that floats around in almost empty space, in the great galaxies of stars or between the galaxies. Very small differences in electric field operating over a considerable time (and the universe has

plenty of time to spare) would give stray atoms tremendous accelerations such as are observed. This is a suggestion made by Dr. W. F. G. Swann, director of the Bartol Research Foundation, Swarthmore, Pa.

There is a possibility that the heavy energetic particles are born in the intense magnetic fields of the sun and are then shot to earth, but this is not the most widely held theory.

Science News Letter, August 7, 1948

PHYSICS

All Helium in Meteorites Due to Cosmic Radiation

► ALL of the helium found in any meteorite was produced by cosmic radiation, Dr. Carl A. Bauer of the University of Michigan calculates.

Cosmic radiation has acted on all meteorites for the same amount of time—ever since the disruption of the parent planet to which these meteorites originally belonged—Dr. Bauer states. The proportion of a meteorite's mass lost in traversing the earth's atmosphere has little effect on the helium content, he reports in *Physical Review* (July 15).

It was Dr. Bauer who last fall announced that iron meteorites arriving from outer space are not seven billion years old, as previously estimated, but only about half that age.

At that time he pointed out that meteorites could be "artificially aged," extremely small amounts of helium gas contained in the bits of heavenly iron resulting from intense cosmic-ray bombardment in outer space. Heretofore it has been assumed that the helium was due to radioactive breakdown of uranium and thorium, the iron fragments having been in existence long enough as solids to allow the helium gas in them to be formed that way.

If cosmic radiation produced helium in small meteorites, the University of Michigan scientist reasons, then this process is sufficient to produce, in the same period of time, all the helium observed in any meteorite.

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ENGINEERING

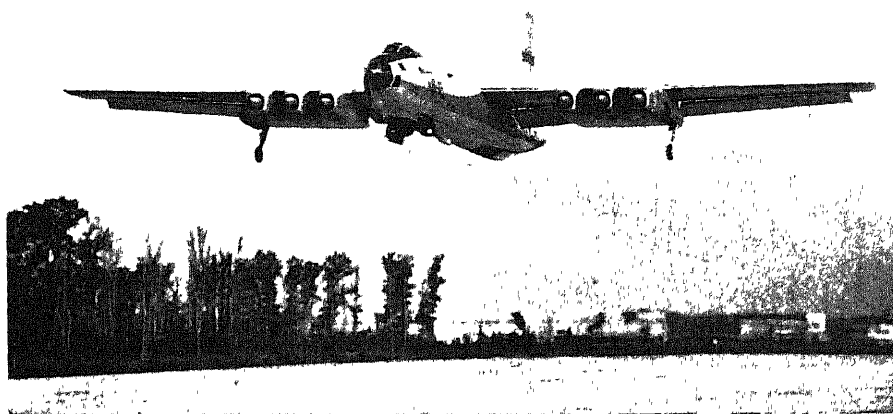
Electrical Insulation Tape Neither Burns nor Chars

See Front Cover

► FINE PAPER-THIN TAPE, a high-temperature electrical insulation developed by Johns-Manville, will neither ignite, melt nor char. It is shown under blow-torch test on the cover of this week's SCIENCE NEWS LETTER.

Brought by the torch to a bright red heat, its thermal life and non-combustibility are demonstrated. Its use will make electrical installations safer from fires from short-circuits. Its trade name is Quinterra.

Science News Letter, August 7, 1948



SIX-JET BOMBER—Undergoing military tests at Wright Field, Ohio, by the U. S. Air Force, is the largest jet bomber of conventional design yet put in the air. It was built by Glenn L. Martin near Baltimore, Md., and for the present will be known as the XB-48. The X will be dropped when tests are completed and the bomber accepted. It will then go into production.

Letters To The Editor

Interests Entire Family

We are new subscribers and took only a short subscription as a trial but the entire family finds the SNL of great interest.—Mrs. Fred J. Hoopes, Paoli, Pa. *Welcome to SNL family.*

Likes Our Style

I like the style and make-up of the periodical.—Louis A. Smith, New York City. *Thanks.*

Artistic Iceberg

The gigantic floating iceberg (Cover, SNL, June 26) resembles a human face.—A. R. Stuart, Brownsboro, Texas.

Not Enough Information

You mentioned a government bulletin in "Saving Cost in Houses" (SNL, June 26). The name and cost of the bulletin was not given. It would have helped if it had been—at least the name. The Supt. of Documents suggests it is: B. M. S. Strength of Houses, application of engineering principles to structural design, \$1.50. Please another time give the name of the bulletin.—Anna E. Myers, Decatur, Ill. *Thanks for the suggestion. It will be followed as far as practical.*

Atomic Bomb's Effects

I have been trying for some time to obtain information on the biological effects of atomic bomb radiations.

To date I have received from authoritative sources only sugary notes which say in effect that little people like me ought not to worry about it; that I ought not to give credence to articles pretending to

have final information, etc., etc., and nauseam. I think that I have learned more from occasional articles in newspapers and magazines than I have from the sources which certainly should be able to tell us what is true, what is not true, and what we don't have any idea about at all so far.

I am a teacher of science. This is a tremendous responsibility, particularly today. If I am to teach biology, chemistry, physics, general science—if I am to open my mouth at all—I must have the truth about what is known so far. Our generation knows that we can help other generations only insofar as we give them the whole truth—as best we know it and as soon as we know it. Even if that truth happens to be "We just don't know," we are still compelled to give it—to provide every solid raw material for thought we possibly can for these young people. Only then have we discharged our responsibility to the future—only then can our new generations be equipped to do a better job of learning to think and work together all over the surface of this planet. . . .

We are in the middle of a vast, largely uncharted sea of information about atomic energy. I want my students to know how little we know, and to know for certain the few landmarks we have been able to glimpse through the fog. What they don't know *could* hurt them. I want them to have every possible scrap of truth about their uncharted sea; then when they take the tiller they may be able to sail a better course than we have done.—Frederick R. Korf, New York, N. Y.

As the facts are published, SNL prints and interprets them. See SNL for Aug. 9, Oct. 11, Nov. 8, and Nov. 29, 1947 and SNL, July 10, 1948. We shall try to do a roundup soon.

INVENTION

Trap Entrance Devised For Rats in Garbage Can

➤ RATS visiting the garbage can in future may find a welcoming little door open to them—with death behind it. Herbert Tsai and Nicholas Chuy of Detroit have devised a trap entrance for garbage cans that lures the rat to go in, delivers a spine-breaking blow when he steps on a treadle, and deposits his carcass with the rest of the garbage. The patent number is 2,445,980.

Science News Letter, August 7, 1948

The *trumpeter swan*, with a weight of about 35 pounds, is the largest flying bird; the great bustard is almost as heavy.

SCIENCE NEWS LETTER

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MEDICINE

Radioactivity Aids Ills

Elements made radioactive are used to treat a blood disease, to attack the cancer problem and to further knowledge of nerve disorders.

► **RADIOACTIVE PHOSPHORUS** from Oak Ridge is being used exclusively for the successful treatment of patients suffering from a blood disease called polycythemia vera at the University of Maryland Hospital in Baltimore, the Atomic Energy Commission revealed in its fourth semi-annual report to Congress.

In this disease, patients have too many red blood cells and in consequence their blood thickens, their spleens enlarge and they have the peculiar blue skin color called cyanotic. The disease extends over many years with the patient growing weak, developing dropsy and heart and kidney trouble.

An attack on the cancer problem with radioactive calcium is being made at Georgetown University Medical School in Washington. This important bone-building element stays in the body longer and is more apt to go to bones and soft tissues when it is in oil-soluble form than when in water-soluble form, the Georgetown scientists have found. Several forms of cancer concentrate calcium, the AEC report of the Georgetown studies states.

Better knowledge of nerve disorders and of thyroid gland function in health and disease are likely as a result of studies with radioiodine and radioactive phosphorus at the Johns Hopkins University in Baltimore as summarized in the AEC report.

New light on resistance to specific germ diseases may come from other studies at this institution and at the National Institutes of Health, U. S. Public Health Service, Bethesda, Md. At Hopkins, radioactive carbon (C14) has been successfully synthesized into an amino acid, arginine. This will be fed to mice in order to label the protein formed in the animals' blood serum.

The animals will then be immunized to some infectious disease and it is hoped the radioactive carbon will show whether the disease-fighting antibodies in their blood are composed of newly synthesized protein or of previously formed protein which has undergone rearrangement after the immunizing shots.

The Public Health Service studies on disease resistance center around use of radioactive carbon, phosphorus and arsenic in preparing radioactive antigens. The antigens are the substances in disease germs which call up disease-fighting antibodies in the blood.

Determining blood loss and blood needs of patients undergoing surgical operations may be done more quickly and accurately in future, if preliminary work with radio-

active phosphorus is borne out by further studies. This work, the AEC report states, is being done at the Medical College of Richmond, Va.

Several anesthetics block the entrance of

ANTHROPOLOGY

Guatemala's "New Look"

► **NATIVE COSTUMES**, long one of the chief tourist attractions in Guatemala, are taking on a "new look." Century-old styles gradually are being discarded in favor of clothes similar to those worn in the United States.

The old, authentic costumes are disappearing, bemoans Mrs. Lilly de Jongh Osborne, who has lived most of her life in Guatemala and possesses a superb collection of textiles.

The colorful native dress typical of each community is donned on religious holidays, important in the life of every Indian. But in most communities cheaper, machine-

radioactive phosphorus into the red blood cell, studies at the University of Virginia, at Charlottesville, show. This, the report states, "points to a possible general action of anesthetics and may aid in explaining the action of sleep-producing drugs."

Better knowledge of what vitamins do in the body may come from studies at Howard University in Washington, in which radioactive phosphorus is being used. At present the studies are concerned with learning how the vitamins affect the utilization of this important chemical in the chick embryo.

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made blouses, skirts and trousers are worn the rest of the time.

Two factors are important in accounting for this change, Mrs. Osborne states. They are:

Easier communication. The natives travel everywhere and are familiar with clothes worn by the outside world.

Higher cost of living. It takes a woman four or five months to weave a good blouse, called a huipil, on the pre-Columbian looms still in use.

Most of the native costumes are made of cotton, which grows plentifully in Guatemala. Where in the past silk was used for



GUATEMALAN FASHIONS—Women of Santiago Atitlan are noted for their halo-like hair arrangement. A gaily colored ribbon many yards long is wound around their head to form a sort of crownless flat hat.

decoration, today rayon is employed. In the highlands where the mornings and nights are exceedingly cool, wool is used extensively.

In contrast to cotton, which for many centuries has been growing in the New World, sheep were brought to this country by the Spaniards. The proportion of black sheep is quite large as the Indians prefer to use this wool undyed for the heavy garments that the men use in many villages.

Guatemalan costumes are noted for their many bright colors, which nevertheless are never harsh. Those made for the Indian's personal use within the village often differ greatly from those which in recent years have been made for the tourist trade, but these also have a typical Guatemalan flavor. Aniline dyes, preferred by tourists, are beginning to replace the lovely vegetable dyes.

Women in their clothes today still retain

a part of their old, traditional dress. Sometimes it is a hand-woven belt or huipil. Often it is reflected in the way their hair is dressed or the manner in which the skirt is worn.

Men's clothes have undergone a more radical change. Many have substituted factory-made overalls for their picturesque woolen aprons or long over-trousers split up the side.

But raincoats or umbrellas are still fashioned just as they were centuries ago. They are gathered from the woods rather than being purchased in a store. Broad palm leaves are easily sewn together into a cape-like affair offering perfect protection from the storm. Sometimes they are worn as a cape about the shoulders, sometimes they are thrown over the head—just how they are used depends upon the section from which the Indian comes.

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NUCLEAR PHYSICS

Atomic Power Timetable

► HERE'S a new timetable for atomic power:

Present power supply of world replaced in any considerable portion by nuclear fuel—20 years minimum, under favorable circumstances.

Fairly practical reactors, useful for special experimental purposes—within 10 years.

Two reactors especially built for power—within two or three years.

The Atomic Energy Commission in its latest report to Congress gives these estimates from an evaluation by its general advisory committee headed by Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study, Princeton.

The possibility was suggested of producing atomic power plants that will actually increase the amount of fuel within them by breeding fissionable material from non-

fissionable uranium and thorium. But the design of such power plants is recognized to be very difficult and slow.

Such production of artificial nuclear fuels is being practiced on a considerable scale at Hanford where plutonium for bombs is made from the inert part of natural uranium. Thorium, a much more common material, can be similarly converted into fissionable uranium 233.

The higher cost of uranium since the war, due to increased demand and higher mining costs of poorer and poorer deposits, seems likely to prevent atomic power from competing with coal power in the United States except where transportation costs of coal from mines is large or where the small bulk and weight of the uranium fuel are particularly valuable.

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ANTHROPOLOGY

Influencing Primitives

► WITCHCRAFT can be useful to modern scientists, when they are dealing with people who believe in witches.

This was discovered by Cornell University anthropologists who have made a study which might be called, "How to Win Friends and Influence Primitive Peoples."

A five-year program of study which began in Ithaca, N. Y., last October with the aid of a grant of \$180,000 from the Carnegie Corporation of New York has resulted in a set of rules for teaching and doing business with primitive peoples. Research included studies of the impact of western civilization on primitive cultures, ranging from southeastern Asia to the American Southwest.

Dr. Morris E. Opler reported that he successfully demonstrated the theory of

germ-borne diseases to a group of American Indians by tying it up with their own belief in witchcraft. If witches were able to plague their enemies with invisible things, Dr. Opler asked the Indians, wasn't it possible that disease might be transmitted in the same way—in a form too small for the eye to see? The Indians agreed and were persuaded to take precautions against disease.

When the U. S. Office of Indian Affairs attempted to stamp out the Indian custom of abandoning and burning the cabins of their dead, Dr. Opler persuaded some Indians that their old custom of fumigating "ghosts" with burning sagebrush might be used for fumigating the cabins.

As an example of the wrong approach, the Cornell scientist cited the story of an

American scientist in India. The scientist, who was interested in raising the living conditions of Hindu villagers, tried to persuade them to grow vegetables in addition to their crops of rice and corn. The villagers laughed at him. He had failed to take into account the caste system which decrees that vegetable growers are a low and unworthy class, only slightly above the Untouchables. Farmers growing cereal grains rank near the top of the social scale.

Dr. Leonard S. Cottrell, Jr., head of Cornell's department of sociology and anthropology, said that the next four years of the research program will include special courses for American students seeking careers in missionary, agricultural and industrial fields overseas, courses for specialists who will measure the impact of western civilization on the backward areas of the world, and visits to research areas by anthropologists and research assistants.

Dr. Opler is gathering material on village life in the Ganges valley in India and plans to visit the area next year. Dr. R. Lauriston Sharp has recently left for Siam. Two other Cornell anthropologists, Dr. Alexander H. Leighton and Dr. John Adair, are establishing a field station in the Southwest in cooperation with the Office of Indian Affairs.

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ARCHAEOLOGY

Relics of Early Indians Found by Archaeologists

► POTTERY FRAGMENTS tempered with fiber, which apparently represent the birth of the ceramic industry among the Indians of the southeastern United States, have been uncovered by archaeologists from the Smithsonian Institution in Washington.

These broken pieces of pottery, which are an important archaeological find, were discovered when explorations along the Savannah river in Georgia and South Carolina revealed what must have been a popular Indian camp for perhaps a thousand years.

Indians, from the prehistoric mound-builders to the Creeks who lived in the area just before the coming of the white men, chose this site for a home and left behind them the traces of 150 habitation sites which are now being scientifically investigated for the first time. The Savannah river sites have been neglected by archaeologists until now, when parts of the area will be flooded in the construction of the Clark Hill Reservoir.

A survey of the region is being carried out as a cooperative project between the Smithsonian Institution, the National Park Service and the Army Corps of Engineers. Carl F. Miller and Joseph R. Caldwell of the Smithsonian staff are working to find and mark archaeological sites for possible future excavation before the reservoir is completed and flooded.

Science News Letter, August 7, 1948

PHYSICS

Weighing Spots Impurity

An electronic device speeds up the detection of impurities in metals from a matter of days by chemical methods to from five to 15 minutes.

➤ **IMPURITIES** in a metal, as little as one part in a million, are detected and weighed by an electronic device revealed by Westinghouse Research Laboratories. It does in from five to 15 minutes a job for which days are required by chemical methods.

The detector is an adaptation of what is known as a mass spectrometer, an electronic tube which sorts out materials in mixtures according to their atomic weight. William M. Hickam, Westinghouse physicist credited with its development, says it spots an impurity by weighing it. The tell-tale weight of its atoms gives it away.

A tiny but powerful furnace, an electron beam and a curved metal tube are the main elements of the device. In use, the instrument is set so that it records only the presence of an impurity with a specific atomic weight.

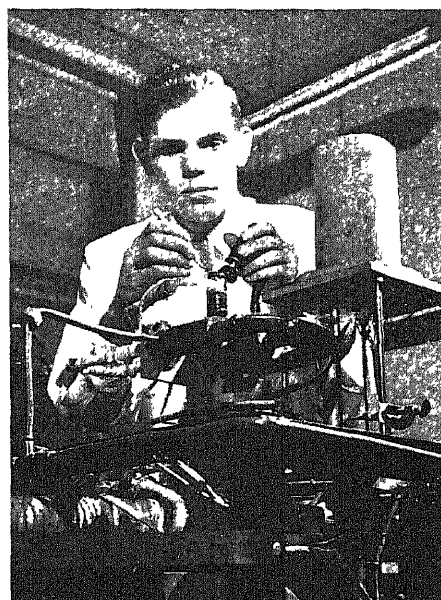
The furnace is used to vaporize a tiny sample of the metal of known weight. The atoms that boil off enter a cube-shaped enclosure where they are bombarded with electrons from the electron beam. This

bombardment knocks off particles from the atoms and thus leaves them electrically charged. These are sent careening down the metal tube at a rate of a million feet a second. The tube is fixed between the poles of a powerful electromagnet.

As the atoms speed down the tube, the electromagnet "pulls" at them in such a way that only those having a certain mass, or weight, complete the path around the tube and pass through a tiny slit in a metal target at the end, Mr. Hickam explained.

The atoms passing through the slit are collected on a metal plate, where they give up their charges. The charges are amplified and counted by electric meters, which show how many atoms of a certain weight are present in the sample. The curvature of the tube is important. Atoms weighing less than those hitting the target are pulled to its inner lining before they can get around the bend, and heavier ones strike the outer wall of the tube as they try to make the curve.

Science News Letter, August 7, 1948



ELECTRONIC DETECTOR—Capable of ferreting out metal impurities weighing as little as one-tenth of a billionth of an ounce, the device is shown being prepared for action by William M. Hickam of the Westinghouse Research Laboratories, who is credited with its development.

CHEMISTRY

Synthetic Rubber Treads

➤ **SYNTHETIC RUBBER** for tire treads, soon to be available and claimed to increase wear more than 30% over the best natural rubber treads, will help make America independent of the natural imported product in case of another emergency. Synthetic rubber inner tubes, a wartime development, are now widely used and are generally acknowledged to be superior to the tubes of natural rubber.

These new treads have been announced by the United States Rubber Company. The key to their manufacture is the fact that they are produced at zero Fahrenheit temperature. Formerly Buna S (GR-S) rubber was made at a standard temperature of 122 degrees. Much research has been conducted in the United States to make the rubber at a lower temperature, in the conviction that a low-temperature product would be better.

The superiority of the new rubber is due to the fact that its molecules are more uniform than those in other rubbers, according to chemists of the University of Minnesota who developed a low-temperature process. The uniformity results from effecting the process of polymerization, a molecule changing action, at the lower temperatures, they said.

In making Buna S rubber, the standard ingredients are 70 parts butadiene, derived from either petroleum or alcohol, and 30 parts styrene, chiefly a coal derivative. When the mixture is put into a container, the top layer is made up of these two ingredients, while below is a layer of water containing a dissolved emulsifier such as soap and usually a dissolved catalyst, an activating chemical agent. In the Minnesota process an organic peroxide is used as a catalyst instead of the inorganic salts usually employed. When the mixture is stirred, polymerization takes place.

The quality of Buna S and similar rubbers seems to go up as the temperature of the mixture goes down, Prof. Carl Shipp Marvel, of the University of Illinois, recently explained. He described the so-called redox process in which the compounds are first emulsified with a soap, and the reaction started with a type of sugar. This method makes it possible to manufacture rubber at freezing or sub-freezing temperatures.

Details of the process used by the United States Rubber Company in making its zero-temperature product are not announced. The rubber in the treads, however, contains furnace black, a carbon black made from

natural gas or petroleum products in a furnace. The rubber developments were carried out in a plant at Borger, Texas, which the company operates for the federal government.

Science News Letter, August 7, 1948

ZOOLOGY

Baby Box Turtles Are Little Stinkers

➤ **BABY TURTLES** temporarily playing the role of skunks are the phenomena reported by Wilfred T. Neill, biologist at Augusta Junior College, Augusta, Ga.

They are the young of the common box turtle, the kind that has a hinge across the middle of the lower plate of its armor. While they are very small—less than one and one-half inches in shell length—this hinge does not work; and it is during this stage of their growth that they give off a powerful stench when disturbed.

Comments Mr. Neill: "The odors of these and other reptiles are usually considered to serve some protective function. It would be interesting to know whether or not this is true, and if true, how the odor protects, and from what enemies. It seems unlikely that many predators would be discouraged by a mere stench, as such."

Mr. Neill reports his observation in the scientific journal, *Copeia* (June 30).

Science News Letter, August 7, 1948

MEDICINE

Migraine Headache Relief Possible with Histamine

► **RELIEF** for migraine headache sufferers is possible with the body chemical believed involved in allergy, histamine, according to two Mayo Clinic physicians, Dorothy Macy, Jr., and Bayard T. Horton.

Their description of the treatment of 144 patients with migraine headache at this clinic from 1937 to 1946 appears in the *Journal of the American Medical Association* (July 24).

While 98 of these patients showed a 25% to 100% improvement, they emphasize that histamine is not a cure for the condition.

Drs. Macy and Horton stated that freedom from migraine attacks in these patients paralleled the period of treatment with histamine. They declared that patients who were free of symptoms after one year or more were still taking histamine once daily or every other day.

Science News Letter, August 7, 1948

DENTISTRY

Healthy Teeth Found Among Hydrofluoric Acid Workers

► **MAKING HYDROFLUORIC ACID** for the Manhattan atomic bomb project seems to have resulted in unusually healthy teeth for workers.

Men on the project who worked in an atmosphere laden with acid fumes had less than half as many dental fillings as did the office workers in the same plant who were not exposed to the fumes, Drs. Peter P. Dale and H. B. McCauley of the University of Rochester report in the *Journal of the American Dental Association*.

"This finding was made in spite of the fact that most of the men neglected their mouths," the doctors wrote.

It is known that fluorine in small amounts is very important to healthy teeth and recently dentists have begun to paint children's teeth with a solution of a fluorine compound to prevent cavities.

Science News Letter, August 7, 1948

CHEMISTRY

Compressed Gas Bubbles May Start an Explosion

► **TINY GAS BUBBLES** make an explosive more sensitive. These little pockets of gas when compressed become hot enough to start an explosion.

Friction on a small piece of grit may also be the factor which turns the relatively slow initial burning of an explosive into a real explosion. These findings were reported to the British journal, *Nature* (March 6) by the Research Group on the Physics and Chemistry of Rubbing Solids at Cambridge University.

Tracing the history of an explosion, the scientists found that liquid explosives which

were set off by impact showed an initial slow burning which proceeded at the rate of about 890 miles per hour. Then, some sudden heating at a point in the explosive material caused the explosion to race ahead at a speed of about 4,000 miles per hour.

Solid materials showed a similar effect. The critical hot place in the material is believed to be due to either air or gas bubbles or grit.

Not all explosives show the two stages in the start of an explosion. One which was tested, lead azide, a solid, showed no initial slow burning but began exploding immediately.

Science News Letter, August 7, 1948

GENERAL SCIENCE

Visits to Chemical Work In Progress in Washington

► **UNUSUAL OPPORTUNITIES** to see the chemical work of the United States Government are being arranged for members of the American Chemical Society attending the 114th meeting of the society in Washington Aug. 30 to Sept. 2. Programs in nearly every field of chemistry are being carried on, ranging from creation of new compounds to testing and standardization of samples of those on the market.

Four major trips are offered chemists attending the meeting, scheduled in such a way that all four of the institutions may be visited by those who wish to, and still leave time for attending sessions in Washington. Beltsville, the research center and experimental farm of the Department of Agriculture, will appeal to many on account of the wide variety of researches there in fields touching the primary one of food supply. Visitors will see investigations of the effect of minor elements, fertilizer investigation, food and nutrition studies and insecticide work. The Naval Research Laboratory offers inspection of a number of chemical laboratories investigating protective coatings, fuels, lubricating agents and plastics, with special emphasis on its microchemical work and its under-water sound studies.

At the National Bureau of Standards, exhibits showing standards of fundamental measurements and pure materials, as well as investigations of rubber, textiles, paper, leather and plastics, and demonstrations of high voltage will be shown. In Bethesda, Md., visits will be made to the Naval Medical Center and to the U. S. Public Health Service's National Institutes of Health, where studies of immunology, blood fractions and cancer research will be seen.

These institutions, at a distance from the center of Washington, will be reached by special busses which are being arranged for at nominal fees to take members directly to the laboratories. So far as possible, these trips are scheduled in duplicate, on different days, to give a better chance for all visitors to go to all of them.

Science News Letter, August 7, 1948



ASTRONOMY

Sundial Shows Midnight And Midday at Thule

► **MIDNIGHT** as well as midday is indicated these summer months by a sundial in Thule, situated on the northwestern coast of Greenland.

Thule, only 800 nautical miles from the north geographic pole, is so far north that the sun is above the horizon continuously for three months. It remains above the horizon for a while each day for another five months.

The angle on the shadow-forming upright or gnomon of this, probably the world's northernmost sundial, is exceedingly steep. The geographical coordinates of Thule are 76 degrees 33½ minutes north, 68 degrees 48 minutes west. Thus the upright has an angle of about 76½ degrees, Lt. Howard P. Smith, Jr., amateur astronomer stationed at Randolph Field, Tex., reports in *Sky and Telescope* (June).

The standard time in Thule, one of the world's most northerly permanent settlements, is four hours less than Greenwich time. The sundial is set within ten minutes of local meridian time.

Science News Letter, August 7, 1948

GENERAL SCIENCE

American-Soviet Science Group Ceases Activities

► **LACK OF FUNDS**, due to failure of the U. S. Treasury Department to grant tax-exempt status, has caused the American-Soviet Science Society to cease activities.

In 1946 the society was offered a grant of \$25,000 from the Rockefeller Foundation for the continuance of its work of acquainting American scientists with the work of Soviet scientists and furthering better relations between the scientists of the U. S. A. and the U. S. S. R.

According to a statement issued by the society's executive committee, the Treasury Department failed to act on the application for tax exemption because the House Un-American Activities Committee is investigating Dr. Edward U. Condon, director of the National Bureau of Standards, who is one of the members of the executive committee.

Since tax-exempt status was necessary to accept the Rockefeller grant, the society has suspended its bulletins since September, 1946.

A collection of Russian scientific and technical books and journals has been deposited by the society with the American Russian Institute in New York.

Science News Letter, August 7, 1948

CIE FIELDS

ASTRONOMY

New Object in Heavens Discovered by Wirtanen

➤ ANOTHER new object has been discovered in the heavens by C. A. Wirtanen of Lick Observatory of the University of California.

Found in the constellation of Pegasus, the winged horse, Dr. Charles D. Shane, Lick's director, states that it is of the 13th magnitude and thus far too faint to be seen without a good telescope.

Instead of being another comet, the object is probably an asteroid moving unusually rapidly across the heavens. Located on plates taken on July 21, it was headed northwest, according to reports received at Harvard College Observatory, clearing house for such astronomical information in the Western hemisphere.

This is the second faint object Mr. Wirtanen discovered in July. On July 15 he reported finding a 15th magnitude comet, located in the near-by constellation of Equuleus, the colt, and headed toward the constellation of Aquila, the eagle.

Early in the morning of July 21, the object's right ascension was 21 hours, 7.8 minutes; its declination plus 12 degrees, 27 minutes. Its daily motion in right ascension is minus 22 seconds, in declination one degree, 28 minutes.

Science News Letter, August 7, 1948

ZOOLOGY

Rattlesnakes Tattooed To Trace Their Movements

➤ TATTOOING RATTLESNAKES, a pastime of Prof. Angus M. Woodbury, is a feat in which he is not likely to be widely imitated. He does it for scientific reasons, marking the snakes with numbers so that they can be identified if picked up subsequently, and their movements thus traced. In the past ten years he has tattooed 777 rattlesnakes and 529 non-poisonous snakes.

The job is done with a home-made outfit consisting of six fine needle points mounted on a piece of piano wire, vibrating within the outer casing of a mechanical pencil. A switch on the outside of the casing controls the vibrator, which was adapted from the "works" of a doorbell. Eight dry cell batteries furnish the power.

It is necessary for the needle points to punch clear through the tough skin, and even the scales, so as to leave some of the India ink in the tissues underneath. Otherwise the markings would be lost the next time the snake shed its skin.

Rattlesnakes are tattooed on the underside of the body just back of the head,

Prof. Woodbury states; non-poisonous snakes receive their identification marks farther aft. The snake is held by an assistant during the tattooing operation; or if he is alone, Prof. Woodbury holds the reptile down with his foot. What the snake says, he does not report.

Prof. Woodbury gives details of his technique in the zoological journal, *Copeia* (June 30). He thinks it can be adapted for use on other lower animal forms such as lizards, amphibians and fish.

Science News Letter, August 7, 1948

PHYSIOLOGY

Crowing Hens Point Way to Useful Gland Discoveries

➤ CROWING HENS, which in older times were regarded with horror as a kind of evil miracle, have indirectly accomplished much good in pointing the way to many useful discoveries in the glandular physiology of chickens and other animals, it was pointed out in a talk given jointly by Dr. Mary Juhn of the University of Maryland and Dr. Richard Fraps of the U. S. Department of Agriculture.

Dr. Juhn and Dr. Fraps spoke as guests of Watson Davis, director of Science Service, on Adventures in Science, sent out over the network of the Columbia Broadcasting System.

Hens crow and in other ways behave like roosters because of disease or other abnormalities in their female glandular system, Dr. Juhn pointed out. Discovery of this fact, years ago, led to much research on the activities of the ductless glands and the effects of their secretions, the hormones.

In one of her own experiments on the influence of hormones on feather growth, Dr. Juhn injected female sex hormone daily into young roosters, while their feathers were growing. Hen-like feathers sprouted. However, she gave the roosters (and herself) a rest on Sundays—and each of these interruptions in the hormone treatment produced a male-pattern cross-bar on the otherwise hen-like feathers.

Dr. Fraps told of his recent discovery in chickens of a hormone known as progesterone, hitherto considered a monopoly of mammals. (See SNL, July 31.) In the latter animal group, progesterone brings about the attachment of the early-stage embryo to the maternal tissues that nourish it and bring it to birth. Its role in birds is anything but clear as yet, but Dr. Fraps thinks it may have indirect effects on egg development and possibly on the presence of a germ-repelling substance in the egg white that protects the growing chick in the shell.

Of course, the presence of this "mammalian" hormone in birds is of great interest to students of evolution, as adding a new bit of evidence of descent of these two widely different groups from a common ancestor.

Science News Letter, August 7, 1948

RADIO-ENGINEERING

Radio Signals Sent from Rocket at 72-Mile Height

➤ A WAR-DEVELOPED DEVICE, for sending automatic radio signals giving scientific information from a roaring rocket high above the earth, operated successfully at the White Sands Proving Grounds, Las Cruces, N. Mex., in a test just revealed, from an altitude of nearly 72 miles while traveling at over 2,800 miles an hour.

The device that provides scientific data from aloft to ground-based recording instruments is known as a telemeter. In this test what is known as the Aerobee telemetering system was used. It has had many successful trials, but this is the first time that this miniature telemetering system has reached an altitude of 71.78 miles above the earth and attained a maximum velocity of 2,830 miles an hour.

The information collected and sent to the ground-based recording instruments include flight characteristics, motor performance and missile aspect, data on cosmic ray intensity, the quality of sunlight above the atmospheric blanket, and changes in the earth's magnetic field. The system has been used to transmit 24 different kinds of information. The records sent are continuous.

The system used in this test was evolved during the war by scientists of Princeton University and of the Applied Physics Laboratory of Johns Hopkins University at Silver Spring, Md. The application to supersonic missiles, those that travel faster than sound, was made at the Applied Physics Laboratory.

Science News Letter, August 7, 1948

WILDLIFE

Western Tourists See New Wildlife Park

➤ VACATION travellers now have an opportunity to see a sample of primitive western American wildlife in its natural environment, with the opening of the new 1,500-acre Jackson Hole Wildlife Park in Wyoming, south of Yellowstone National Park. A fence, so arranged as to be practically invisible, surrounds 400 acres of the area, keeping elk, bison, moose, deer and pronghorn within easy sight of the automobile road. Horseback trails make more of the wilderness accessible to those who wish to stay longer.

This newest wildlife park has been set up on land made available by John D. Rockefeller, Jr., and his son Laurance S. Rockefeller. The Wyoming Game and Fish Commission, the Jackson Hole Preserve, Inc., and the New York Zoological Society are cooperating in its development.

Although the new park is open to tourists only during the normal season for easy travel, it will be used by research zoologists on a year-round basis for the study of the ways of wild animals.

Science News Letter, August 7, 1948

PSYCHIATRY

Psychiatry Comes of Age

By an act of Congress money has been appropriated which is being spent on research, training, treatment, public education and prevention of mental ills.

By DR. ROBERT H. FELIX

Chief, Mental Hygiene Division,
U. S. Public Health Service

Written exclusively for Science Service

➤ A RELATIVELY NEW kind of medical science today is lending a skilled hand to thousands of Americans battling problems that seem too big for a man to fight alone. The new science seems till now to have slept in a cloud-capped tower ever since its birth more than a half century ago.

This awakening science is psychiatry. You have heard a lot about it. You've seen stories and pictures that ran in newspapers and magazines not long ago about the terrible bedlams in which some American mental patients are kept. You've seen beautiful, but troubled, ladies in movies who were straightened out in six reels by a handsome brain doctor with a silky voice and a hypodermic needle.

Insanity Fraction of Problem

Chances are, however, you have always thought of insanity as something that happened to somebody else. You were partly right. Actual insanity, according to the best psychiatrists, is only a tiny fraction of the problem psychiatry is setting out to lick. It touches only a few Americans—less than three-quarters of a million of us are in the mental hospitals. There are at least 8,000,000 who suffer some form of mental sickness, however, and it is estimated there are another 10,000,000 now living who will spend some part of their lives in a mental hospital.

Pick up your daily newspaper. Read the headlines: "Torture suspect confesses"; "Mother stabs infant to death"; "Unwed mother attempts leap—prefers death to life without lover."

A Harvard University sociologist predicts that by 1957 the number of divorces will equal the number of marriages. Alcoholism, sex atrocities, and bobby-sox criminals alarm parents everywhere.

These tragedies are symptoms—symptoms of human, personal crises that burst forth suddenly like flames from a smoldering rag pile. They are symptoms of a kind of sickness traditional medicine has hardly touched. It is a sickness of the mind, not the body. It is by no means always violent; more often it rests in quiet desperation, in cumulated failures, frustration and worry. Often it leads simply to unhappy, fruitless lives. Sometimes to divorce, alcoholism or

crime. Sometimes the path ends in the mental hospital.

Yet the happy truth is that in the early phases most of this tragedy can be prevented by the kind of expert counsel psychiatry is prepared to give now. Hundreds of thousands of Americans who are on the brink of mental or emotional disaster can be guided toward self-salvation by the mental health clinics the States are now organizing with funds provided by the Federal Government.

For the first time in history, a nation is attempting to bring the benefits of the new science psychiatry to its whole people. Stirred by the frightening number of young men and women whom the Selective Service, the Army and the Navy had to reject because of mental or emotional upsets, Congress passed the National Mental Health Act, appropriating \$4,500,000 for the first year's program, and placing that program with the U. S. Public Health Service.

The Public Health Service's attack on mental illness which began in July of 1947 with the \$4,500,000 is almost identical in technique with the Federal attack on cancer which began ten years ago. It was outlined by a council chosen from the best psychiatric brains in this country, the National Advisory Mental Health Council. Under this outline, Federal money, supplemented in some instances by State funds, is being spent on research, training, treatment, public education and prevention.

Research Grants

So far research grants have been made to more than 30 universities, hospitals and other institutions as well as to individuals in order to study the causes, treatment and prevention of mental illness. More than 20 fellowships for research have been financed. Research will be carefully planned and coordinated, as was done with cancer, so that an organized, interconnected body of knowledge will begin to grow with a minimum of duplication.

Grants have also been made to medical schools and other institutions to train urgently needed personnel—psychiatrists, clinical psychologists, psychiatric social workers and psychiatric nurses. It is expected that eventually occupational and recreational therapists and other mental health personnel will receive training under the program.

Of most concern to the public, however, is the plan to bring mental health facilities to as many U. S. neighborhoods as possible. This is the vital preventive phase of the program, and over half the total appropria-

tion will be spent here. By the first of the year more than 40 States have had their plans approved. In many States the plans are well under way.

One of the stiffest battles the Public Health Service and the States will have to fight will be to persuade the average U. S. citizen to bring his mental and emotional problems to a psychiatrist, just as he takes his broken limbs to a general practitioner.

What the public was not told when the stories about the mental hospitals were running, is that only about 10% of the mentally disturbed persons in this country are ill enough to be in hospitals.

Preventive Treatment

Like the submerged bulk of an iceberg, the six or seven million Americans the Public Health Service estimates need some degree of mental or emotional guidance are not seen, either by practicing psychiatrists or the hospitals. It is these six or seven millions in the rural areas as well as the towns and big cities that the clinics must eventually reach with preventive treatment. These are the unhappy mortals who are sick of their jobs, sick of their families and friends, sick of their very lives. These are the Walter Mittys, the little frustrated people whose daily paths are concentric circles. And they are the ones whom psychiatry can promise very real help. It can



NATION-WIDE PROGRAM—Under the direction of Dr. Robert H. Felix, a program for community mental health clinics has been started by the U. S. Public Health Service.



LOOK-OUT FOR MENTAL AILMENTS—Mental disorders can be spotted early. The little girl is depicting one symptom as she becomes upset when the arithmetic problem will not come out right.

do a lot, given enough staff, funds, equipment, and the like.

The experience of the Army and the Navy during World War II proved beyond any question that the pre-psychotic—the man on the road toward mental illness—can be restored to useful life.

When Dr. William Menninger, one of this country's outstanding psychiatrists, testified before a Senate subcommittee on the National Mental Health Act, he underlined one fact: "Most significant of the entire (Army) experience was the predominance of minor psychiatric problems, which . . . constituted 80% of the problems of diagnosis and treatment. One can only assume that this experience is applicable to civilian life."

Dr. Menninger was quite right. It does apply to civilian life. But good treatment, given early, will nearly always cure the early cases. Here is the crux of the whole problem: find the half-sick seven millions, destroy their fear of mental treatment, then treat them.

Long ago people were ashamed to admit they had tuberculosis; more recently, they were afraid to go to public clinics for treatment of venereal disease. Today they are even more afraid to be found in a psychiatrist's office, or, worse, a mental hospital. Persons known to be getting mental treatment have lost their jobs, their friends. "So-and-so is going to a psychiatrist—he must be nuts," is too often the popular verdict.

For this reason, the Public Health Service

hopes that mental health clinics will be made physically a part of general health clinics or hospitals so that visits to a psychiatrist will come to be considered as no different than visits to a pediatrician, let's say, or a gynecologist.

By no means does everyone with problems too big for him need a psychiatrist, and of course there are not enough psychiatrists to see everyone who needs mental and emotional guidance. It is here that the general practitioner fits into the program.

Training Personnel

During this fiscal year, over \$1,000,000 will be spent on training the several types of personnel who make up a mental health clinic—psychiatrists, clinical psychologists, psychiatric social workers, and psychiatric nurses. But a large part of the training program will cover medical students, many of whom now learn little about psychiatry during a whole four years in medical school.

With good training in psychiatry behind him, plus some internship in a mental hospital or clinic, the general practitioner could become the bulwark of a psychiatric program. There will always be more of him than of psychiatrists, and no one hesitates to bring their problems to the family doctor.

Before any large number of medical students can get the needed training in psychiatry, however, the public mental health clinics will have been functioning for some time. Where will they get their

patients? How will they actually reach the public, and how can the public be persuaded to use them? The answers to these questions will decide the most vital point in the whole mental health program. Can psychiatry be carried to the public-at-large?

The Public Health Service hopes that the ice will be broken by having patients referred from private physicians, from the schools, Community Chest agencies, courts and welfare organizations. The public health nurse is a tremendous case-finding tool. She sees everyone except the rich. She can be very helpful in referring to the clinic children and grown-ups in need of mental and emotional guidance.

Gradually, the public will learn that good psychiatry is by no means frightening to the patient, nor anything to be ashamed of seeking. It is by no means always the half-hopeless struggle against the dark mystery of schizophrenia, and its techniques are by no means limited to the "shock" treatments, "truth drugs," or other violent or dramatic treatments. Usually, it is nothing more than skillful questioning—and listening—by the psychiatrist. The gradual persuasion of a patient to understand and help himself. A patient's good points are skillfully balanced against his weaknesses—he is slowly given insight into his problems.

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Do You Know?

Some 19,500 persons were killed in America during 1947 in *farm accidents*.

Lions in nature are gang fighters; tigers usually fight alone because this animal usually hunts by himself.

Puerto Rico has a *population* of 618 persons per square mile, compared to 47 in the United States.

More vivid color printing is promised by the use of *zirconium*; this little-known metal is the main ingredient of zircon, a semi-precious gem.

Suntan preparations and sunburn preventives, unlike most cosmetic products are prepared for use by both sexes; perfumes acceptable to both must therefore be used.

The *tropical papaya*, which produces an edible fruit resembling a cantaloup, looks somewhat like a palm tree but it is not related to the palm.

The *stripes* that make the zebra and the tiger so conspicuous in the zoo make them hard to see in their natural habitats; they are one of nature's best examples of camouflage.



High on the list of conveniences which the Type E offers to users of sensitive galvanometers is freedom from frequent "spot chasing."

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Jrl. Ad. ED22 (5c)

Psychiatrists, the Public Health Service believes, will one day be accepted by the public as readily as surgeons or dentists. They are very truly human beings. Sometimes they need to visit other psychiatrists.

MEDICINE

Warn Ex-Syphilitic Vets

➤ A WARNING is being issued to veterans who were treated in service for syphilis with penicillin that they need periodic check-ups because there is a possibility that between 20% and 30% of these cases were failures, officials of the Veterans Administration stated.

The old Army treatment for the disease with arsenic and bismuth was time-tested and results were therefore predictable. The disadvantage in this 26-week treatment was that one out of every 30,000 was killed while penicillin has proved superior without killing any patients. However, penicillin treatment is still in an early stage. It will require about 20 years study and follow-up to determine the effect on the patient.

Meanwhile, Uncle Sam is worried about the boys who received treatment and thought themselves cured because in many cases the patient received either inadequate treatment, because of discharge did not get the necessary blood and spinal fluid tests required for a year after treatment or was

discharged before he got an examination of his spinal fluid.

Syphilis, if not treated, or inadequately treated, may attack the heart and nervous system and therefore in many cases leads to insanity. Officials estimate that each case of insanity in a veteran costs the taxpayer \$40,000 from the time the patient is admitted to a hospital until his discharge.

They estimate that approximately 400,000 veterans were treated while in service in the armed forces. About 52,000 veterans were treated in 1946 following their discharge but there is no way of telling what proportion were infected after they got out and which of them were relapse cases. No one has followed army cases long enough although an attempt will be made to do this in the future.

The officials of the Veterans Administration cautioned that without preventive action now, syphilis in veterans will cost the taxpayer around one billion dollars in the course of the next 25 years.

Science News Letter, August 7, 1948

MEDICINE

Mix Vaccine-Toxoid Shots

➤ CHILDREN will get better protection against diphtheria and whooping cough when the materials used for the anti-diphtheria and anti-whooping cough shots are combined in one mixture instead of being given separately.

Studies showing this are reported by Dr. Joseph A. Bell of the U. S. Public Health Service in a report to the *Journal of the American Medical Association* (July 17). The studies were made in Norfolk, Va., and neighboring territory, beginning in 1941.

Children from the ages of two to 23 months were selected for the test and divided at random into two groups. One group was given an alum-treated mixture of whooping cough vaccine and diphtheria toxoid. They got two shots of this, four weeks apart.

The other group got whooping cough vaccine and diphtheria toxoid in separate injections.

Of 407 children who got two doses of the mixed product, 48 got whooping cough. Among the 385 who got two doses of the vaccine alone, 158 cases of whooping cough occurred.

A year after receiving the first injection, 992 children in the diphtheria study were given Schick tests, the standard method of

determining immunity to diphtheria. A positive reaction to this test shows susceptibility to diphtheria. There were only one-third as many positive reactions in children who got the mixed product as in those who received unmixed toxoid.

The mixed vaccine-toxoid shots are effective in babies as young as two to five months old and side reactions, Dr. Bell reports, are "few and negligible." But at least one of the doses, he advises, should be given after a child is six months old for best protection.

Science News Letter, August 7, 1948

PUBLIC HEALTH

Smallpox Disappearing in Nation, Figures Show

➤ SMALLPOX has almost disappeared in the United States. The number of reported cases dropped 50% from 1946 to 1947 and 98% in the last decade, a survey by the Metropolitan Life Insurance Company shows.

During the first 20 weeks of this year only 45 cases of this dangerous disease have been reported. This is about one-third the corresponding figure of a year ago.

Science News Letter, August 7, 1948

CHEMISTRY

See How Atoms Tie Up

Neutron beam technique permits the photographing of the pattern produced by a stream of neutrons when they scattered by passing through an ice-crystal.

► FOR THE FIRST TIME scientists have actually been able to see how hydrogen atoms tie up to the oxygen atoms in a piece of ice.

Drs. E. O. Wollan, C. G. Shull and W. L. Davidson of the Oak Ridge National Laboratory in Oak Ridge, Tenn., have found that hydrogen atoms are not stay-at-homes, fixed in one position, as proposed by some scientists. Instead, the hydrogen atoms are restlessly jumping from one position to another in the crystal structure of ice.

A method of locating the tiny hydrogen atom in a crystal was described by Drs. Wollan and Shull at the International Congress of Crystallography at Harvard University. Since hydrogen is present in all of our foods, fuel, clothing, and many other materials, such studies are of great potential importance.

The Oak Ridge scientists photographed the pattern produced by a stream of neu-

trons, the particles which trigger an atomic bomb, when they have been scattered by passing through an ice-crystal. The pattern is like a shadow picture of the atomic structure of the crystal. It can give scientists a great deal of information about the internal make-up of the material through which the neutrons have just passed. A wide variety of other substances in addition to ice have been studied by the neutron beam technique.

Many times in the past the patterns formed by streams of electrons and X-rays have been photographed but neutrons act very differently and their patterns give a new view of crystal structure.

Production of diffraction patterns with neutrons is much more difficult than getting the patterns with electrons and X-rays. Only recently has this feat been accomplished with neutrons from the chain-reacting pile at Oak Ridge.

Science News Letter, August 7, 1948

CHEMISTRY

Dyes Close to Explosives

► REPORTS from Ludwigshafen, Germany, that the destructive explosions, which wrecked the chemical plant of the I. G. Farben works, came from the methyl violet factory serve to remind the world of the close connection between dyes and explosives. They are made from the same coal-tar chemicals. One of the reasons for Germany's great development of the coal-tar dye industry before World War I was her interest in developing the explosives industry at the same time.

The dual nature of the element nitrogen, at once the safest and the most dangerous of the common elements on which life depends, is responsible for this latest chemical disaster, as it was in the case of the ammonium nitrate explosions at Texas City last year and at Oppau, Germany, some 20 years earlier. The present explosion, however, was not due to ammonium nitrate, a supposedly safe material. Methyl violet, the dye chemical reported to be the cause of the Ludwigshafen explosion, belongs to a class of compounds known to be chemically unstable. Methyl violet belongs to the class of triphenyl methane dyes in which three nitrogen atoms are combined in each molecule with a quantity of carbon and hydrogen. It is a distant relative of the explosive T. N. T. In any such compound, given the right conditions, the normally mild and inert nitrogen may suddenly change part-

ners and the result may be an explosion.

The true chemical explosion occurs when an unstable substance changes into a more stable one, giving off heat as it does so. The products are usually gases, and the heat given off by the explosion puffs them out into a larger volume, wrecking anything solid that may be in the way. In the accounts from Ludwigshafen, one explosion after another seemed to have been set off in this way, so that the result was a sort of "chain reaction." After such a conflagration is once started, the intense heat may continue to make materials not normally explosive vaporize suddenly with results as disastrous as those of the deadliest nitrogen compounds. There is a report that rocket fuels, with their high oxygen content, were among the products of this plant. If so, these would add to the fierceness of the flames.

Science News Letter, August 7, 1948

CHEMISTRY

Selenium Produced in New Fibrous "Wool" Form

► THE "MOON ELEMENT," selenium, used in electric current rectifiers and photocells, is produced in a new fibrous form similar to glass wool by a process on which an English inventor, D. L. A. Driver of London, has been granted patent 2,445,768.

The molten selenium is sprayed through the series of nozzles into a chamber, where forms a felted mat of "wool" on a moving belt. This mat can be rolled for storage, or immediately cut into disks for use in rectifiers or photocells. Rights in the patent are assigned to Standard Telephone and Cables, Ltd.

Science News Letter, August 7, 1948

Science Service Radio

► LISTEN in to a discussion on mental health for the world on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDT Saturday, Aug. 14. Watson Davis, director of Science Service, will have as his guests two of the leaders of the International Congress on Mental Health, to be held in London Aug. 11 to 21. They are Dr. John R. Rees of London, President of the International Committee for Mental Hygiene and organizing chairman of the congress, and Dr. Lawrence K. Frank of Ashland, N. H., Chairman of the International Preparatory Commission.

Science News Letter, August 7, 1948

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Dimension Invented

➤ A FIVE-DIMENSIONAL WORLD, in which space and time have been broken up into chunks so small that they cannot be divided any further, has been invented by a British mathematician.

This new geometry adds a new "uncertainty dimension" to length, breadth, thickness and time. It is described by Prof. H. T. Flint, of the University of London, as necessary to take account of that paradoxical offspring of quantum mechanics, the "uncertainty principle," in explaining the behavior of subatomic particles.

"There have been indications during the past 20 years," Prof. Flint reports to the American Physical Society in *Physical Review* (July 15), "that existing physical theories break down when applied to the microscopic phenomena of physics."

In the subatomic world, distances below a certain definite length have no physical meaning. Prof. Flint therefore suggests a geometry based on these smallest units of length.

The result is a mathematical system which adds one more dimension to the four space-time coordinates of the Einstein theory of relativity. This new dimension expresses the strange fact, long accepted by atomic physicists, that a particle such as an electron cannot be exactly located or

"pinned down," but measurement of its position involves a definite uncertainty. Scientists can say for sure that the electron is somewhere within a given region, but they can't say exactly where. The amount of uncertainty is closely related to the mass of the particle.

Since space and time are tied together by the theory of relativity, an error in locating the particle in space also means an error in locating it in time. Both these "necessary errors" can be calculated by five-dimensional mathematics. Although no new physical principle is involved in the world of five dimensions, a neater mathematical technique is suggested for describing the behavior of the smallest particles in the universe.

Over 2,000 years ago Euclid invented the first geometry, using only two dimensions, and describing only figures that can be drawn on a flat surface. Until 42 years ago mathematicians were certain that space had only three dimensions, but at that time Einstein first presented to the world his revolutionary space-time continuum, with time as the fourth dimension. Now it appears that non-mathematicians, already groggy from trying to comprehend the fourth dimension, will have to assimilate a fifth.

Science News Letter, August 7, 1948

ENTOMOLOGY

Mosquitoes Survive Cold

➤ MOSQUITO-BITTEN mortals who console themselves with the thought that the first cold weather will be the death of all these pests are being cruelly deceived: not all of their blood-thirsty tormentors will die. Some are likely to survive in sheltered spots, and in the spring will lay their eggs to produce another pestiferous generation.

Egg-laden female mosquitoes can survive a surprising degree of cold, states Charles O. Masters of Cleveland, a graduate stu-

dent who is making a special investigation of the ecology of mosquitoes.

In one forested area which he has under observation there is a long culvert, seven feet in diameter. Into this he has made weekly trips through two winters, walking 200 feet or more into the darkness and observing, by means of a flashlight, hundreds of mosquitoes clinging to the walls, mostly overhead.

As the weather becomes colder more and more of them lose their hold and drop into the water flowing along the bottom. Practically all of these are washed outside and so perish. Some, however, fall on dry ground and remain there until warmer weather "unstiffens" them and permits them to crawl up the wall again.

Spiderwebs, paradoxically enough, are the salvation of a few insects. They fall upon old webs, and when they revive they escape and crawl to safety.

The severe winter of 1947-48 was much harder on the mosquito population of the culvert than was the milder winter of 1946-47, Mr. Masters states. As night temperatures dropped to 10 or 15 degrees Fahrenheit throughout most of January, the insects were still able to hold on; but a sudden drop to five degrees below zero

wiped out almost the entire population. An hour's search in the culvert turned up only one mosquito, and that a member of a malaria-bearing *Anopheles* species, still clinging to the wall.

Mr. Masters carried home 24 mosquitoes of another and more abundant species which he found lying numbed above the water-line. Most of them revived when taken indoors.

Science News Letter, August 7, 1948

BIOCHEMISTRY

X-Raying Mold Boosts Production of Penicillin

➤ PENICILLIN PRODUCTION can be greatly increased through treatment of the molds that produce it with X-rays. This is disclosed in newly-issued U. S. patent 2,445,748, taken out by Dr. M. Demerec, head of the genetics department of the Carnegie Institution of Washington, whose laboratory is at Cold Spring Harbor, N. Y.

X-ray doses of from 50,000 to 150,000 roentgen units are applied to mold spores. Most of them are killed, but among the survivors are newly induced, mutated strains which produce larger "crops" of penicillin than those currently in use. The same technique can be applied to other molds producing other compounds, states Dr. Demerec, and if desired atomic fission radiations and even cosmic rays may be employed instead of X-rays.

Since Dr. Demerec's discovery was made in the course of federally supported wartime research, the patent is assigned to the government.

Science News Letter, August 7, 1948

CHEMISTRY

Advanced German Method For Oxygen Determination

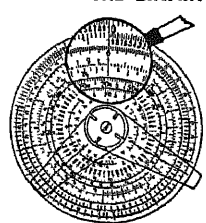
➤ AN ADVANCED METHOD for the direct determination of oxygen in a compound, developed and widely used in Germany, is reported by British investigators and is now available to American technicians.

In this method the compound is decomposed in a stream of nitrogen, and the products passed over heated charcoal. The oxygen is thus converted to carbon monoxide which is then passed into iodine pentoxide. The determination is completed either by weighing the carbon dioxide produced after absorption in Ascarite, a sodium hydroxide-asbestos preparation particularly developed for carbon monoxide absorption, or by titration of the liberated iodine.

A report of the complete method, together with other German developments of interest in the field of organic microchemistry, is available from the Office of Technical Services, U. S. Department of Commerce, for \$7.50 in photostat form, or \$2.75 in microfilm form.

Science News Letter, August 7, 1948

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Books of the Week

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AMERICAN SEXUAL BEHAVIOR AND THE KINSEY REPORT—Morris L. Ernst and David Loth—Bantam, 174 p., paper, 25 cents. Reprint of a book originally published by the Greystone Press. A lawyer and a biographer give some of the applications and implications they believe will result from the Kinsey report.

BATTLEFRONTS OF INDUSTRY: Westinghouse in World War II—David O. Woodbury—Wiley, 342 p., illus., \$3.50. The absorbing story of the contributions of a big industry and research organization varying from gun mounts to atomic fission, bug bombs, to airplane launchers.

CAMERA & LENS: Studio, Darkroom, Equipment—Ansel Adams—Morgan and Lester, 120 p., illus., \$3.00. An important book for professional or amateur photographer as well as anyone planning to buy photographic equipment. Beautifully illustrated with the author's photographs.

CHART OF THE ISOTOPES—G. Friedlander and M. L. Perlman—General Electric Company, 26 x 50 inches, paper, free upon request to the General Electric Company, Schenectady 5, New York. Containing information about the known isotopes and with plenty of empty spaces for keeping the chart up to date.

COLLEGE PHYSICS—Henry A. Perkins—Prentice-Hall, 3d ed., 786 p., illus., \$6.65. Revised to include radar, atomic physics and other new developments.

COMMERCIAL FLOWER FORCING: The Fundamentals and Their Practical Application to

the Culture of Greenhouse Crops—Alex Laurie and D. C. Kiplinger—Blakiston, 5th ed., 550 p., illus., \$4.75. Revised to include newest practices and labor-saving devices.

EARLY TALES OF THE ATOMIC AGE—Daniel Lang—Doubleday, 223 p., \$2.75. Engrossing and intimate stories that take you behind the scenes in the production of an atomic bomb. They originally appeared in slightly different form in the *New Yorker*.

FEEDING THE HUMAN FAMILY: Science Plans for the World Larder—F. Le Gros Clark—Sigma, 125 p., illus., \$2.35 approx. A book written in the food-importing country, England, with full realization of the seriousness of the world-wide problem.

THE GOODNOW MOUND, HIGHLANDS COUNTY, FLORIDA: Containing a Report on the Skipper Site, Highlands County—John W. Griffin and Hale G. Smith—Florida Board of Forestry and Parks, 36 p., illus., paper, free upon request to the Florida Board of Forestry and Parks, Tallahassee, Fla.

GRASS: The Yearbook of Agriculture, 1948—Govt. Printing Office, 892 p., illus., \$2.00. Here's a book for: The suburbanite trying to make his front yard green; the cattleman interested in range management; the conservationist who wants to save America's soil; the botanist concerned with plant identification or breeding.

IDENTIFICATION OF TUMORS: Essential Gross and Microscopic Pathologic Features Systematically Arranged for Easier Identification—N. Chandler Foot—Lippincott, 397 p., illus., \$6.00. Intended as a brief guide and aid to differential diagnosis.

INTERNATIONAL CONTROL OF ATOMIC ENERGY—POLICY AT THE CROSSROADS: An Informal Summary Record of the Policy Developments Concerning the International Control of Atomic Energy, October 15, 1946 to May 17, 1948—Department of State—Govt. Printing Office, 251 p., paper, 45 cents. Basic "paper" and record on the attempt to secure international control through the United Nations special commission and background to the forthcoming General Assembly discussion at Paris.

LONCHOCARPUS, DERRIS, AND PYRETHRUM CULTIVATION AND SOURCES OF SUPPLY—E. C. Higbee—Govt. Printing Office, 36 p., illus., paper, 15 cents.

THE MACHINERY OF THE BODY—Anton J. Carlson and Victor Johnson—University of Chicago Press, 3d ed., 639 p., illus., \$4.50. A well known text, revised to include the more significant of the advances during World War II.

MAP OF THE WORLD—American Geographical Society, paper, \$2.50. Height above sea level is shown by the colors, marshes and other topographic features by symbols, and great circle distances by a chart printed on the back. A clear, useful map for wall use.

MINE OWN EXECUTIONER—Nigel Balchin—New American Library, 190 p., paper, 25 cents. A novel originally published by Houghton Mifflin and later made into a movie, this book gives an understanding of the personality of

a schizoid individual and also some of the problems of the practicing psychiatrist.

THE OUTLOOK FOR WOMEN IN MATHEMATICS AND STATISTICS—Women's Bureau—Govt. Printing Office, 21 p., illus., paper, 10 cents. Describing vocational opportunities.

THE OUTLOOK FOR WOMEN IN PHYSICS AND ASTRONOMY—Women's Bureau—Govt. Printing Office, 32 p., illus., paper, 15 cents. Vocational opportunities in two fields of science.

ROAD TO SURVIVAL—William Vogt—William Sloane Associates, 335 p., illus., \$4.00. A dramatic setting forth of the whole world's great dilemma, that of rapidly diminishing natural resources and of rapidly increasing numbers of mouths to feed and hearts to suffer. The author, conservation expert of the Pan-American Union, points out what he sees as the only "road to survival."

SCIENTIFIC RUSSIAN READER: Selected Modern Readings in Chemistry and Physics—Noah D. Gershevsky—Pitman, 253 p., \$3.50. For students who have already studied from 20 to 30 hours of Russian.

SOIL MECHANICS IN ENGINEERING PRACTICE—Karl Terzaghi and Ralph B. Peck—Wiley, 566 p., illus., \$5.50. For engineers and others concerned with the properties and behavior of soil.

STABLE ISOTOPES—Atomic Energy Commission, 8 p., paper, free on request from U. S. Atomic Energy Commission, Isotopes Division, P. O. Box E, Oak Ridge, Tenn. A description together with information as to where they are available.

WEATHER ELEMENTS: A Text in Elementary Meteorology—Thomas A. Blair—Prentice-Hall, 3d ed., 373 p., illus., \$5.65. With new chapters on the characteristics of air masses and fronts and the relation of weather to aviation.

Science News Letter, August 7, 1948

Three different kinds of mineral water flow from separate openings only three feet apart at the Maytubby Springs in Oklahoma.

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⚙️ **SHOE protector**, now patented, is a flexible cover shaped to fit over the front of the shoe with an elastic strap to pass around the heel. An arched metal spring fits over the toe.

Science News Letter, August 7, 1948

⚙️ **OIL INDICATOR FLASHES** an amber or a red light on the automobile dashboard when the oil is one quart or two quarts, respectively, below normal. The lights are electrically connected to an indicator plug which replaces the old crankcase plug. The weight of the oil, transmitted to a diaphragm, activates an electrical resistor, allowing current to flow to the lights.

Science News Letter, August 7, 1948

⚙️ **SPONGE RUBBER** of a new non-inflammable, low-cost type can be delivered through a hose, where it sponges at the nozzle, or cast in sheets as paper is made. It can be applied and vulcanized directly to upholstery materials and the backs of carpet to provide resiliency as well as flame resistance.

Science News Letter, August 7, 1948

⚙️ **OXYGEN TENT** canopy of clear transparent plastic, shown in the picture, is satisfactory from the doctor's and the hos-



pital's standpoint; important also, it lessens the dread that often comes to patients with other tents. The canopy can be discarded after one use or it can be sterilized with alcohol for reuse.

Science News Letter, August 7, 1948

⚙️ **ALL-PLASTIC TRUMPET** which has

high tonal quality is intended for the student field rather than to compete with standard makes of brass instruments. This low-cost trumpet is precision built, light in weight and has feather-touch valve action.

Science News Letter, August 7, 1948

⚙️ **DRY-SHAVE RAZOR**, which may be carried around in a vest pocket and needs no shaving cream or electric motor, has a tiny T-shaped razor blade which is flipped back and forth in a slot as the razor is rolled back and forth across the face.

Science News Letter, August 7, 1948

⚙️ **HIGH-FREQUENCY ANTENNA**, for automobile communications systems, is whip-like in appearance and is designed for mounting on the roof of the car. A special feature is a locking device, a single clamp which by pressure and biting into the metal roof from above and below provides a rigid mount.

Science News Letter, August 7, 1948

⚙️ **BODY PROTECTOR** for baseball umpires is made of a rubber-like plastic over which is a cloth covering. Weighing only three pounds, it is about one-fourth the weight of older protectors. When deflated, it can be rolled into a small package.

Science News Letter, August 7, 1948

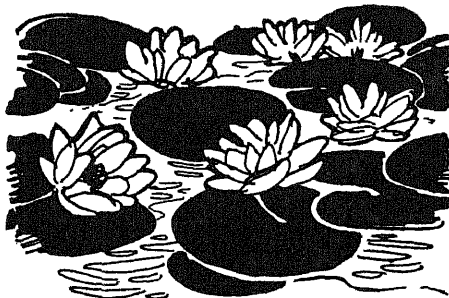
• Nature Ramblings by Frank Thone •

➤ **SERENE**, cool, immaculate, the waterlily floats beneath the summer sun, with big, flat drops of water shining on its round, flat leaves. The waterlily has been the delight of poets of all ages and peoples. Of philosophers, too, who like to reflect how all that superb beauty has been extracted from the black mud of the bottom, where the rootstocks of the plant have their hold.

There are only a few kinds of waterlily in America. The white one is the most familiar, as well as the most beautiful. And it has the advantage over the European white waterlily in that it is very fragrant. Then we have a smaller yellow species, vulgarly called cow-lily or spatterdock, in the eastern states; but in the Rocky Mountains, where the white one does not grow, a second yellow species reaches a much larger size.

Real home of the waterlilies, however, is in the tropics. There they develop all sizes and colors, including delicate pinks, glowing reds and gorgeous blues. Many of the choicest tropical waterlilies have been intro-

Flower of the Nymphs



duced into cultivation in the temperate zones; fortunately it is possible to grow them to maturity and get blossoms in a single season. All you need to do is plant the seed after the water has warmed up sufficiently in the spring. You can even start tropical waterlilies by tossing the seed into a shallow farm pond that isn't too

much churned up by wading cattle.

One waterlily species, the *Victoria regia* of tropical South America, claims the distinction of having the largest of all known leaves. These natural rafts, with their up-turned rims, have sufficient power of flotation to carry the weight of at least a child, if a framework of light lath is set down first to prevent the burden from being concentrated in one spot and thus breaking through the leaf tissue. The flowers of this giant-leaved waterlily, however, are relatively small and inconspicuous.

Botanical names sometimes sound harsh to the layman, but there can be no quarrel with the Latin name of the principal waterlily genus. There is some disagreement among botanists on this score, but both of the names that are in use are beautiful. One school calls it *Castalia*, which is the name of a fountain where the Muses of Greek mythology used to come. Other botanists, following the lead of the great Linnaeus, call it *Nymphaea*, which needs no explanation.

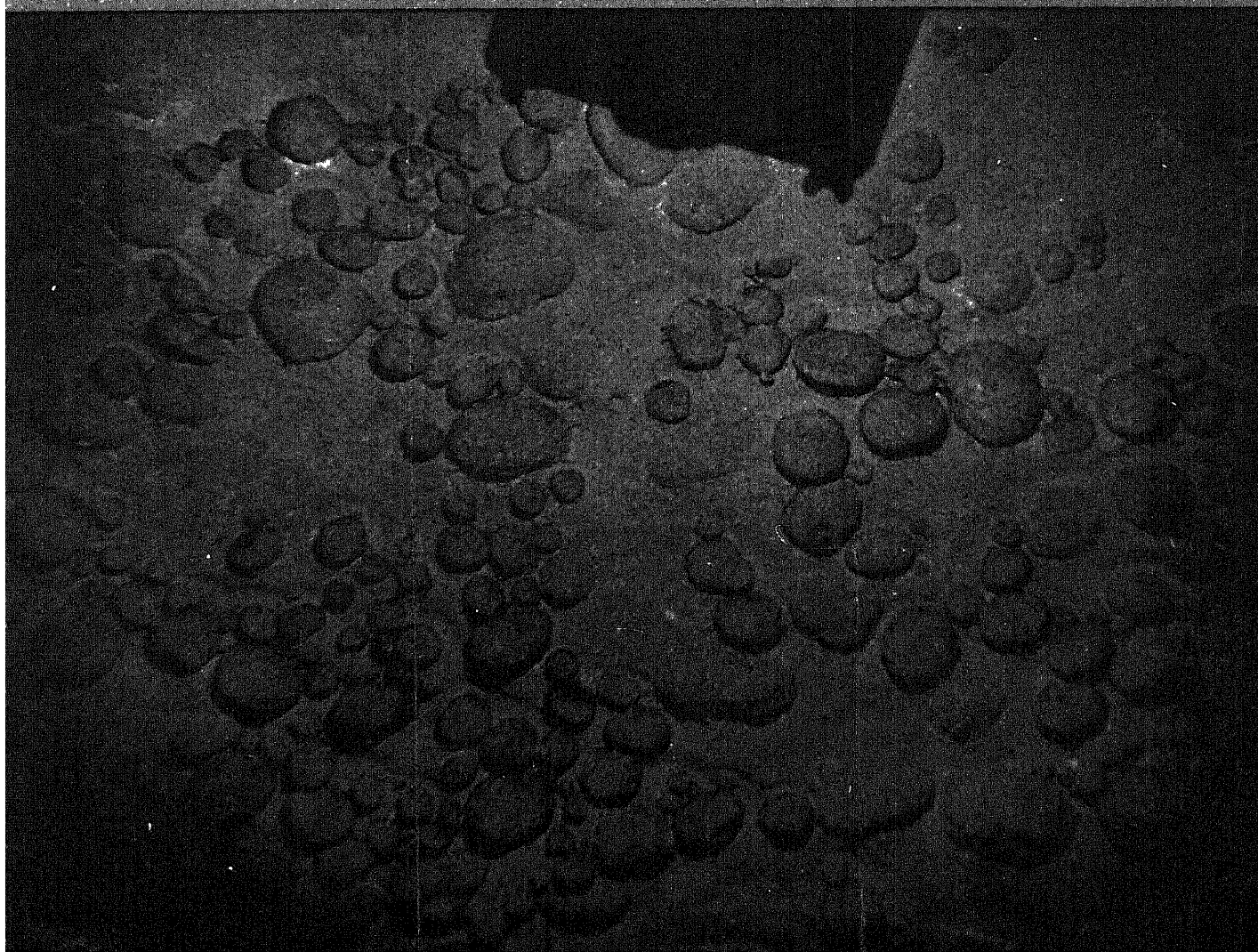
Science News Letter, August 7, 1948



AUGUST 14, 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Penetrating the Deep

See Page 99

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GUARDIANS OF RURAL ELECTRIC SERVICE—These devices, called GR circuit reclosers, will be installed on rural electric lines to guard against prolonged service interruptions. These units reclose the electric circuits automatically following such interruptions as might be caused by overloads, short circuits or other temporary difficulties. The work is being done at Westinghouse Electric Corporation's East Pittsburgh Works.

MEDICINE

Hope of Quick Polio Test

French scientist has developed simple test which consists of injecting material from a suspected polio victim into the brains of mice. Requires more study.

➤ HOPE of a quick and simple test for the infantile paralysis virus to replace the expensive monkey test now used is revived by a report from Dr. Pierre R. Lepine, of the Pasteur Institute, Paris, to the journal *Science* (Aug. 6).

Such a test would help doctors tell positively whether a child with a little fever and upset stomach, for example, is infected with the polio virus or just having an attack of the now prevalent "summer gripe."

In addition, it would speed trials of new drugs for polio, since doctors trying them could be sure they were given to actual cases of infantile paralysis. At present this is difficult to determine and lack of such knowledge means a drug must be tried in very many cases before doctors can be sure it is successful.

Efforts to learn how epidemics spread could also be speeded by a simple test in-

expensive enough to perform on every suspected case.

Dr. Lepine's test is simple enough. Essentially, it consists in injecting material (feces) from suspected polio patients into the brains of five mice. Two days later the mice are given an injection into the brain of active Lansing mouse-adapted polio virus. At the same time another five mice are injected into the brain with the Lansing virus only. Within 10 or 11 days, at least four out of five of these last mice should be dead or paralyzed. But at least three out of five mice also injected with the suspected polio material should be alive and well. The virus they got from the patient would have protected them against the fatal dose of Lansing virus that killed or paralyzed the control mice. If the material did not protect them, the patient did not have polio.

This kind of test, called interference

protection, has been tried before by other scientists but has not proved successful. Whether the details of Dr. Lepine's test, such as method of concentrating the material from patients, method of inoculation and time intervals, will make the difference between success and failure of the test remains for future study to determine. Also to be learned is whether the test will succeed with other strains of polio virus.

Science News Letter, August 14, 1948

CHEMISTRY

Synthetic Resin Makes Deciduous Woods Usable

➤ THANKS to a synthetic resin, woods such as maple, beech, birch and poplar can be used to make a paper of excellent quality, the National Bureau of Standards revealed. Woods formerly little used may now help ease the shortage of printing stock.

Most papers made from wood come from the evergreen spruce, fir, hemlock and pine, with some other wood used to supplement them. Deciduous woods, from trees that shed their foliage annually, are now used only as filler in the manufacture of high-grade printing paper. They do not produce the primary qualities of strength and resistance to surface pick in the usual methods of processing. However, with the addition of melamine formaldehyde, the resin employed, they acquire the desirable qualities.

The discovery of the process for using deciduous woods in papermaking is important because the supply of the ordinary woods used is rapidly decreasing. Large quantities of the non-coniferous trees are available, and the process provides an economic use for them.

In conventional papermaking, the fibers are prepared for fabrication by mechanical beating in water. Beating causes the fibers to absorb water and form a gel-like film on their surfaces by a structural change called hydration. This gel is the cement that bonds the fibers together to give paper of conventional manufacture its strength.

The beating, however, is accountable for unwanted qualities. It promotes some of the most troublesome behavior of paper in printing, including high expansion, excessive curling, slow oil absorption, and show-through of images.

The new technique substitutes the synthetic resin bonds between the fibers for the gel-like bonds formed by hydration. The resin bonding gives strength with only a fraction of the beating required without it, and it produces a superior paper by elimination of the adverse effects of hydration.

Several types of synthetic resins were used by the National Bureau of Standards, but the melamine-formaldehyde resin gave the best results to date. Surprisingly small amounts of this resin are required, usually less than 3% by weight.

Science News Letter, August 14, 1948

MEDICINE

Radioisotopes Cancer Aid

Iodine, gold and cobalt, made radioactive, hold the greatest hope in the fight against cancer. At present, this form of treatment is still in its early stages.

➤ **EXPLODING ATOMS** are among science's greatest hopes today in the fight against cancer.

Just as radium and the surgeon's knife can be used to destroy some malignant tissue that is cancer, so radioactive elements resulting from the processes of the atomic bomb can be used to wipe out some malignant growths.

Iodine, gold and cobalt in radioactive forms are the most promising of the potential anti-cancer radioisotopes.

No scientist would be foolhardy enough—or cruel enough to cancer victims—to hold out too much hope in individual cases. Nevertheless, the years of human life to be saved by future applications of radioisotopes promise to compensate many times over the loss of human life due to use of the atomic bomb in warfare—if the world can arrange not to use the atomic bomb as a weapon in the future.

When the cancer is in the thyroid gland, radioiodine is used as a means of diagnosis and often as treatment. The thyroid gland picks up and utilizes nearly all of the iodine in the human system, normally about 80 times as much as any other tissue.

When the uranium atom splits up—fission, it is called—as it does in the atomic bomb and in the more peaceful chain-reacting uranium pile, one of the many elements formed is a special kind of iodine with a weight 131 times the mass of the hydrogen atom. This special fission-made iodine gives off powerful gamma rays, like radium does. It can therefore destroy human tissue if it can get at it. Since it is attracted to thyroid tissue, it can be used to destroy it, whether or not it is diseased. Separate out this particular kind of iodine from all the many products of uranium fission as the Atomic Energy Commission does at Oak Ridge, Tenn., feed it to the patient and the radioiodine will go to the thyroid and do its work. Fortunately, this kind of radioiodine is relatively short-lived, half of it losing its activity in eight days. So it is relatively safe to use, since it will not go on with its lethal bombardments when they are no longer needed.

For treating over-active thyroid glands, a condition known as toxic goiter, radioiodine has been very successful. The Mayo Clinic reports success in 80% of the cases treated. Radioiodine also helps to diagnose the disordered thyroid, whether it is over-active, underactive or cancerous. It is also used as a tracer to locate the deposits of thyroid cancer tissue in various parts of the body far removed from the parent growth—metastases they are called.

The results of treatment of thyroid cancer with radioiodine have not been nearly as satisfying as the treatment of toxic goiter. The latest report of the Atomic Energy Commission explains that malignant thyroid tissue often does not pick up as much of the radioactive iodine as does the normal thyroid tissue. Much research is underway, some of it very promising, particularly attempts to put the radioiodine in organic compounds that will be selectively absorbed by cancerous tissues.

At the Sloan-Kettering Institute for Cancer Research in New York, animal experiments are testing whether natural antibodies can be made to carry radioiodine to special parts of the body, such as the liver and kidney, there to administer strong doses of radioactivity.

The metal cobalt when irradiated in the Oak Ridge pile emits radiations similar to those of radium. Since it can be made inexpensively and fabricated into special applicators, it will come into general use for cancer treatment when handling and dosage are worked out.

The radioactive form of phosphorus is

being used to treat leukemia, a cancerous condition of an excess of white corpuscles in the blood, and results are as effective as X-ray therapy without causing uncomfortable radiation sickness. This use is based upon the fact that phosphorus concentrates in the blood-producing centers.

Treatment of cancer by radioisotopes is still in its early stages. Much more must be learned about basic bodily processes generally, and specifically what molecules concentrate in diseased body tissues and can therefore carry to them the exploding atoms that can blast out the disease.

Science has had ample supplies of radioisotopes for only a short time as scientific progress goes. The first shipment of a radioisotope was made from Oak Ridge just two years ago (Aug. 2) and it was radiocarbon 14, a substance that Massachusetts General Hospital research hints may be absorbed rapidly by diseased tissue when it is incorporated in protein compounds.

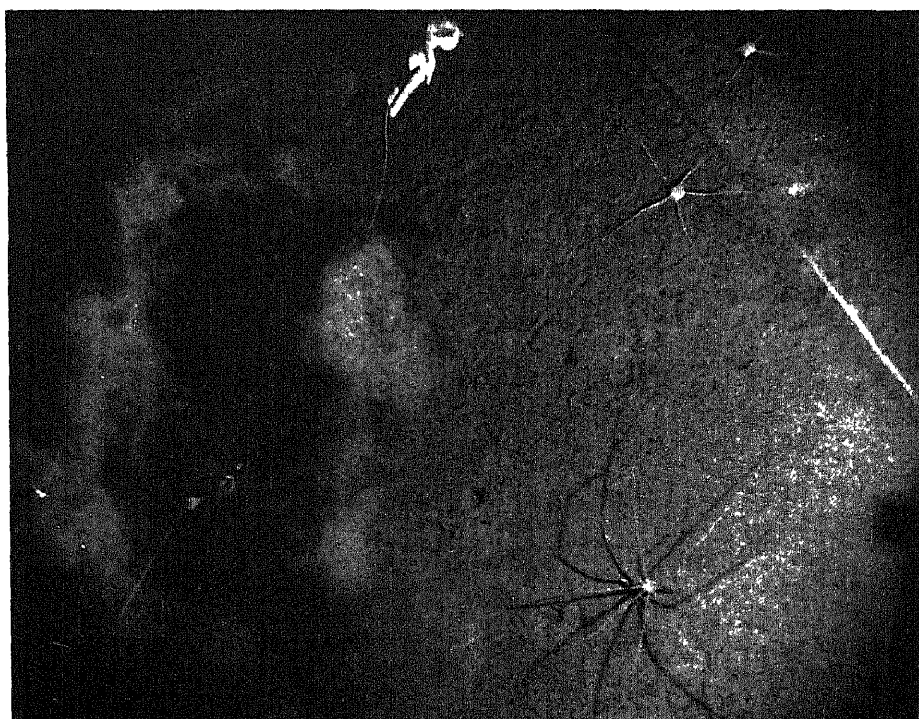
Science News Letter, August 14 1948

PHOTOGRAPHY

Photographs of Sea-Life Taken at 3.5 Mile Depth

See Front Cover

➤ "LOWEST-DOWN" of all photographs thus far taken in the sea is one just brought back from the North Atlantic by the Woods Hole Oceanographic Institution research vessel *Atlantis*



6,000 FEET UNDER THE ATLANTIC—The sea spider, about 28 inches across, and a few brittle stars were snapped by an underwater camera some 100 miles south of Cape Cod. The cloud is caused by the arrival on the bottom of the fishline which was attached to the camera.

T. S. 100

Taken with a special pressure-resistant camera and brilliant flash bulbs at three and one-half miles' depth, the picture on the cover of this week's SCIENCE NEWS LETTER shows on the bottom a colony of roughly elliptical objects believed to be

sponges.

Another picture, taken at the relatively shallow depth of 6,000 feet (not much more than a mile) shows several brittle-stars and a sea-spider.

Science News Letter, August 14, 1948

Letters To The Editor

Big Sister Unhappy

You said in an article about soap operas (SNL, July 3) that "Big Sister is happily married." I happen to listen to that program and I know that Big Sister is very unhappily married on the program and isn't living with her husband.—Miss S. Richman, New York City.

When the study was made in 1945-1946 Big Sister was happily married. The findings made at that time still hold true for Big Sister inspires her listeners by her unselfishness and wisdom in dealing with others.

Boring Into Wood

I saw leaf-cutter bees this year at my brother-in-law's farm in Devon, Kansas. They look like you say they do (SNL, July 24), but instead of eating on the roses they bore holes in the wood. He is after them all the time as they are destroying the wood in the barn and house.

He told me there was a barn near him that is almost eaten up by these bees and they have cutters in front of them just as you said. They do look like bumble-bees only slimmer.—Mrs. Harry Glick, Dawn, Mo.

Your observation on the habits of the leaf-cutter bee is correct: the insect does dig holes in wood. These are to be its home: it lines them afterwards with the cuttings it makes from the leaves of roses and other plants.

For protection, here are two suggestions: (1) Paint. The leaf-cutter won't go through a covering of paint to get at wood. They always do their work in unpainted wood. (2) If painting is not practicable, apply a strong solution of DDT, residual-type, using either whitewash-brush or spray-gun.

Not Poisonous

In an article headed "Poison Gas in Atmosphere" (SNL, July 3) the text indicates that methane is described as a poison gas. My personal experience with methane, and the available literature regarding toxicity of methane toward human beings, indicates that methane can not be described as a poison gas.—Thomas S. Bacon, Dallas, Texas.

Thanks. In a strict sense methane is not a poisonous gas. Authorities inform us that although suffocation could be caused if sufficient methane were in an occupied space, experiments in which methane and oxygen were mixed in proportion of 80% methane and 20% oxygen demonstrated that animals could live unharmed in such an atmosphere.

Science News Letter, August 14, 1948

PHYSICS

Ultrasonic Sound Waves Detect Flaws in Metals

➤ HIGH-FREQUENCY sound waves, far too high for the human ear to hear, are being used by General Electric to discover and record small flaws in metals.

A new device, developed to permit the use of these waves called ultrasonic by scientists, shoots 1,000,000 cycle-per-second sound waves through the metals to be tested, and simultaneously plots a graph which shows any flaws in the metal's interior. Testing is carried out by immersing the metal specimen in oil, because these sound waves will not travel through air.

A small sound-wave transmitter, wired to the main body of the instrument and also immersed in the oil, sends the waves through the oil and through the metal sample. Waves are interrupted by a crack or other flaw in the metal, and the flaw is indicated on the graph. The transmitter is a small crystal which is made to vibrate and produce sound waves by an electric current. The receiver has a similar crystal

Science News Letter, August 14, 1948

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MEDICINE

Parasite Poses Problem

Amebic dysentery, a tropical parasitic disease that riddles the intestines, may be more prevalent than suspected. Fear many are "carriers."

► A LARGE PORTION of our population may be harboring a dread tropical disease that bores into the intestines and makes chronic patients of its victims.

One million veterans and 15,000,000 men and women in civilian life may be playing host to amebic dysentery, the parasitic tropical trouble-maker.

This estimate, based on the findings made at the Veterans Administration's Tropical Disease Clinic, Winston-Salem, N. C., under the direction of Dr. Thomas T. Mackie, professor of preventive medicine at the Bowman Gray Medical School of Wake Forest College, appeared in an article by Chester S. Davis in the *Winston-Salem Journal* and *Twin City Sentinel* (Aug. 8).

(In Washington authorities pointed out that the results at Winston-Salem may apply only to the veterans examined and may not be typical of the nation-wide situation.)

Mr. Davis's estimates are based on the fact that of 330 veterans examined in this clinic in the past 18 months, 134, or 40.6%, had amebic dysentery. Another 46 veterans were found to have other tropical diseases. He states that "in less than one percent of the cases had these diseases previously been diagnosed, although most of the infestations already were four and five years old."

Men who came to this clinic for the

most part had vague, undiagnosed complaints that refused to respond to treatment elsewhere but presumably they were suspected of having tropical disease when sent there and that may weigh the figures in these findings.

However, the magnitude of this problem has increased with the return of many men from service in tropical areas who may be unsuspected casualties of the disease. These are the facts presented by Mr. Davis:

A person may be chronically ill for many years before the true nature of his infection is discovered, for few doctors are trained to detect it. There probably are not more than 12 fully trained men actively practicing tropical medicine in the U. S. Many persons may be carriers, for the amoebae surround themselves with hard shells and these cysts are passed in the feces to find another victim. There is no cure for this intestine-riddling disease when allowed to progress too far.

A one-celled protozoa is the parasitic agent in this disease which over a period of time may riddle the intestine with small, round ulcers. In these aggravated cases the painful "bloody flux" is a common symptom. The amoebae may get to the liver via the blood vessels and there produce inflammation and abscessing that may lead to death.

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GEOPHYSICS

"Doodlebug" Hunts Oil

► THE INNER WORKINGS of the wartime "doodlebug" pest to German U-boats in the Atlantic were revealed at the Westchester County Airport, N. Y., by the Gulf Oil Corporation to a group of science writers. Its application to oil surveys was also demonstrated.

Its proper name is the magnetometer. It is a device housed in a bomb-like structure which is trailed behind and below an airplane. Its delicate magnetic instrument reacts to magnetic influences below, even to a submarine concealed deep in the ocean. It was used during the war, and since, to locate hidden iron ore deposits. Its greatest use today is in the search for petroleum, even oil under swamps and in the ocean bed.

It has already been used in many surveys for oil, including an 85,000-square-mile area of the continental shelf in the region of the Bahama islands where other scientists, working under giant diving bells,

used gravity methods. The magnetometer method is now being used to explore a great tract in Africa with American planes and American instruments. Many other surveys have been made over dry land and almost inaccessible swamps. One great value of the magnetometer is its ability to survey hard-to-get-at areas, and do it with great speed.

The magnetometer reacts to the earth's magnetism in addition to iron and steel objects and to deposits of magnetic ore. As explained by Gulf scientists, the earth's magnetic field varies in intensity. The variations of importance in oil explorations are those caused by differences in composition and proximity to the surface of the magnetic igneous rocks which comprise the underlying or basement rock found in all areas.

When the structural configuration, or form, of these basement rocks is such as to bring them relatively close to the surface,

a magnetically high area will be indicated by the instruments. Thus, by the variations in these magnetic measurements the geophysicists secure information which permits them to make a contour map, which shows variations in the composition and structure of the earth's basement rock.

The overlying sedimentary rock may reflect a similar configuration, which can indicate the existence of geological conditions permitting the accumulation of oil.

The heart of the magnetometer is a magnetically sensitive element about the size of a cigarette. Its findings are transmitted to the instrument in the plane through the trailing cable. The air-borne magnetometer's success is due in large part to its ability automatically to orient itself at all times so that it is in perfect alignment with the earth's magnetic field.

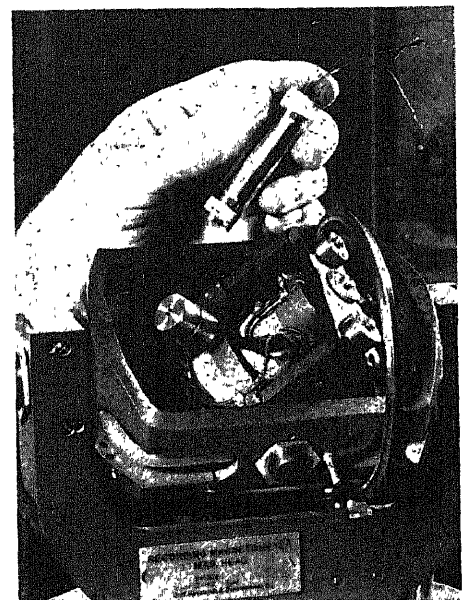
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MEDICINE

Fever Plus Penicillin Has More Anti-Syphilis Effect

► A TEN PERCENT improvement in syphilis treatment is obtained when artificially induced fever is added to the seven and one-half day penicillin treatment, a group of doctors headed by Dr. Herman N. Bundesen, president of the Chicago Board of Health, reported in the *Journal of the American Medical Association* (July 31).

Penicillin alone rated 70% effective and



NERVE CENTER—Heart of the air-borne magnetometer, housed in a bomb-like structure which is lowered beneath a moving airplane, is the small tube-like piece being held by the hand in the photograph.

penicillin plus fever 80% effective, they report from six months studies at the Chicago Intensive Treatment Center.

The fever treatment does not cut down on the time required for penicillin treatment of syphilis. Neither does giving larger amounts of penicillin without fever prove more effective.

The 80% effective method consisted of an injection of sodium penicillin every three hours for 60 doses plus three sessions,

each three hours long, of artificial fever on alternate days beginning 23 hours after the first injection of penicillin.

The doctors reporting the study with Dr. Bundesen are: Drs. George X. Schwemlein, Kettering Foundation for Medical Research, Cincinnati; Theodore J. Bauer, U. S. Public Health Service; Robert M. Craig, Dayton, Ohio; and Jack Rodriguez, Chicago.

Science News Letter, August 14, 1948

AERONAUTICS

Cross-Wind Landing Gear

► **LIGHT AIRPLANES**, equipped with relatively new types of cross-wind landing gears, can take off and land across the wind as safely and with no more skill required than in ordinary into-the-wind operations, the Civil Aeronautics Administration revealed in a recent report.

This government agency initiated an investigation of the possibilities of cross-wind landing gears for airplanes in 1945. One objective is to save costs in airport construction. Modern ports at the present time must have sufficient runways to enable airplanes to be landed directly into the wind, or not more than 22.5 degrees from directly into the wind, for all winds in excess of four or 10 miles per hour. This means extensive tracts of land for airfields and much heavy expensive construction.

The report, entitled Cross-Wind Landing Gears, covers tests made with two light planes, a Fairchild PT-19 and the Piper J-3. Several other planes with cross-wind landing gears have also been tested and will be covered in a later report.

Basically this cross-wind landing gear consists of castered wheels with castering restraint. The idea is not new. The Bleriot

plane, which made the first flight across the English Channel, in 1910, was equipped with one type. An American patent was issued Bleriot in 1911 for his so-called undercarriage.

Also some early planes were equipped with the tricycle type undercarriage which incorporated main fixed wheels behind the center of gravity of the plane and a castered nose wheel. This might be termed a cross-wind landing gear.

Prior to World War I, the castered and tricycle type undercarriages had been almost universally discarded in favor of undercarriages having two fixed wheels ahead of the center of gravity and a castered or steerable tail-skid or V-wheel.

The present cross-wind landing gears were not designed by the government but by individual airplane manufacturers at the suggestion of the CAA. The two covered in the present report have been flown by some 200 pilots, none of whom gave an unfavorable report on either landing or take-off characteristics. Cross-wind landing gears for heavier planes, including transports, are expected soon.

Science News Letter, August 14, 1948

ENGINEERING

Home Heating Studied

► **A SPECIAL BUILDING** to study home heating stoves and furnaces now in operation, in London, has many unique features all designed to provide accuracy in the research activities. It is called a calorimeter building because calorimeter cabinets, in which individual heating appliances can be installed and tested, constitute its principal feature.

The building is a four-story brick structure occupying a ground area of about 3,000 square feet at Greenwich. Its four calorimeter cabinets, about the size of living rooms in small houses, are centrally mounted within larger rooms in which the temperature can be kept constant. The cabinets are designed so that heat from within passing through the walls, floor and ceiling is automatically measured.

The cabinets are of air-tight construction with specially balanced draft arrangements

to eliminate leakage and to enable the amount of incoming air to be measured. The total useful heat from the heating appliance can thereby be determined by direct measurement. It is also possible to measure separately radiant heat, warmed air from convection jackets, and heat to the boiler water.

These calorimeter chambers are on the ground floor. Above them are smoke-testing rooms. The chimneys from the cabinets pass through these upper rooms. They are equipped for smoke measurements. The rest of the building is occupied largely by laboratories and the equipment to keep the constant temperatures required surrounding the calorimeter cabinets. For summer-time use, and for appliances of high heat output, cooling is provided by a refrigeration system.

The calorimeter cabinets are constructed

of quarter-inch plywood panels, covered on both sides with copper sheeting divided into two by 1.5 foot sections. Differential thermocouples are embedded at the mid-points of each copper section, directly opposite each other on the inside and outside of the plywood panels. This permits the temperature difference across the walls, floor and ceiling to be measured and recorded electrically.

In order to measure the smoke in the smoke-testing rooms, a beam of light is sent through each flue through special windows for the purpose. The intensity of the smoke is measured by a photocell. Smoke samples can be taken from each flue for other tests by means of a smoke sampler which can be inserted into the flue and then removed.

Science News Letter, August 14, 1948

PHYSICS

"Superfluid" Is Neither Liquid, Solid Nor Gas

► **A "SUPERFLUID"** which leaks through the tiniest openings and apparently defies gravity by flowing uphill was described by a Massachusetts Institute of Technology scientist.

The "superfluid" is helium, the second lightest element, cooled to 457 degrees below zero Fahrenheit. At that temperature, within a degree of absolute zero, helium is neither a liquid like water, a gas like steam, nor a solid like ice. It is a fourth state of matter, called superfluid.

Prof. Laszlo Tisza, Hungarian physicist at M. I. T., describes the strange behavior of helium at very low temperatures in *Physics Today* (August), a publication of the American Institute of Physics.

Here are some of the startling properties of this superfluid:

It conducts heat better than any other known substance.

It leaks between two pieces of optically-ground glass pressed together.

Slightly heated, by a flashlight bulb, it squirts out of a tube to form a fountain eight inches high.

Part of it will creep up the side of a container.

Unlike any other known substance, it will not freeze at temperatures near absolute zero.

Prof. Tisza suggests that this fourth state of matter might also be called "quantum liquid," because it supports the quantum theory that molecules move at absolute zero. Classical theory held that all motion should cease at absolute zero.

Helium with an atomic weight of three instead of the usual four should, according to the laws of quantum physics, prove even more weird in its behavior. It may not form a liquid at all or may form a liquid with entirely strange properties. Attempts are being made to obtain rare helium three in large enough quantities to make experiments.

Science News Letter, August 14, 1948

ENGINEERING

Jets Blast Well Casings

Bazooka principle is being successfully used in a new method of perforating oil well casings. Greatly increased flow is claimed.

► THE WAR-FAMED BAZOOKA, which enabled a single man to pierce enemy armor-coated fighting tanks or to destroy concrete structures with a blast or two from a hand-carried weapon, is now in use in increasing the flow of petroleum into deep, partly exhausted oil wells where the pumps can capture it.

It is a modified bazooka, of course. When lowered within the casing of the well and detonated it shoots jets through the casing walls and deep into the surrounding formation. It is designed to replace the bullet-shooting device, long used, which makes openings through which the oil can flow.

This new method of perforating oil well casings was developed in Fort Worth, Texas, by Welex Jet Services, Inc., and although less than a year old has already successfully been used on 150 wells, some low-producing new wells and others which had reached the stripper-well status. Greatly increased flow is claimed for every application.

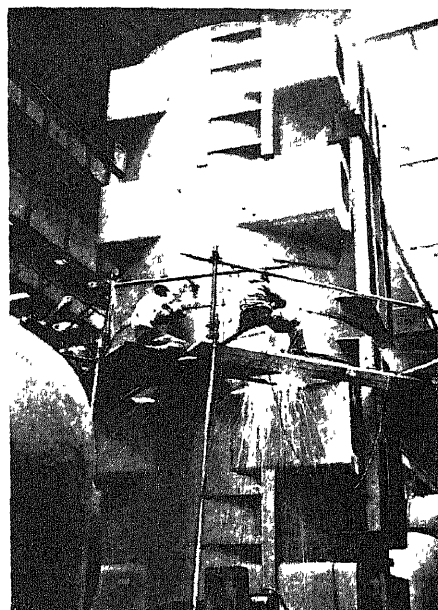
Unlike a bullet, which is a metal projectile propelled by expanding gases, the Welex jet is a high-velocity, directionally controlled penetration force which derives

its tremendous energy from the electronic detonation of a special powder. With a velocity of some 25,000 feet per second, every jet shot penetrates the casing pipe in the well and far back through surrounding cement and formation. It is said to be far more effective than the bullet method.

The success of the bazooka rocket, which proved far more effective than bullets as armor-piercing tank destroyers, and the success of the Welex Jet as well, depends upon the detonation of so-called "shaped charges." It goes back to what physicists know as the "Munroe effect" which was announced to the world in 1888 by Prof. Charles E. Munroe.

He found that if a hollow is made in an explosive cartridge on the side toward the object to be blasted, the effect is greatly increased. The hole can be a conical cavity or hemispherical in shape. The principle is already in use in certain types of mining operations. Its first use in war was probably in the bazooka rocket which made it possible for one man to blast his way successfully through thick concrete with an explosive that he could carry in his two hands.

Science News Letter, August 14, 1948



GIANT TURBINE GENERATOR
—Two 15-foot sections of the frame of a 150,000 kilowatt generator are shown being welded in General Electric's turbine shop in Schenectady. It will weigh more than 400,000 pounds, including core and windings, and will furnish enough power to light a city of 450,000 people.

PUBLIC HEALTH

WHO Plans Its Program

► PEOPLES of the eastern Mediterranean region and east Asia will be the first to be helped to better health by the World Health Organization.

This was revealed by Dr. Thomas Parran, U. S. Public Health Service, and Dr. Martha Eliot, U. S. Children's Bureau, on their return from the first World Health Assembly held in Geneva, Switzerland, in July. Drs. Parran and Eliot were two of the U. S. delegation to the assembly. Third U. S. delegate was Dr. James R. Miller, a trustee of the American Medical Association.

WHO activities will be decentralized as much as possible, the assembly decided. Headquarters will be at Geneva, but there will be six regional centers, each with its own administrative headquarters. The six regions determined on are: the western hemisphere, Africa, the eastern Mediterranean, southeast Asia, the western Pacific and Europe.

Malaria, tuberculosis, venereal diseases, maternal and child health and environmental sanitation will be the chief concerns of the World Health Organization.

These five were picked by the World Health Assembly after consideration of what could be done to improve world health with WHO's present rather sharply limited overall budget of \$5,000,000.

Certain functions of the League of Nations Health Section and the International Office of Health of Paris, concerning exchange of information on epidemics, new methods of treating disease, standardization of drugs and so on, have been inherited by WHO and will also be carried on.

Special budgetary provision has also been made for aid to countries in case of national health emergency such as the cholera epidemic in Egypt last year.

Science News Letter, August 14, 1948

CHEMISTRY

Cheaper Shoes Promised by Chemical Tanning Process

► A NEW CHEMICAL PROCESS for tanning leather promises cheaper shoes and other heavy leather products.

The process, developed by Dr. A. H.

Winheim of St. Louis, vice-president of International Leather Chemicals, Inc. and Dr. Edward Doherty of Buford, Ga., technical director of Bona Allen, Inc., produces leather comparable to those from good vegetable tannage at a cheaper cost. It also makes possible greater versatility by giving the leather a wide range of characteristics.

With the wiping out of the chestnut trees, America's former greatest domestic source of tannins, much research has been undertaken to find chemical tannage for heavy leathers. Fine leathers can be made with synthetic agents, called syntans, but these compounds have not been accepted for heavy leathers.

In the new process, the prepared hide is first treated with a compound of the dialdehyde type, such as glyoxal, and then with resin-forming agents, such as urea or phenol (carbolic acid), or with combinations of these substances and formaldehyde.

Controlled acid treatment with formaldehyde yields leather of high quality. The rigidity which might result from the process is prevented by the addition of a blocking agent. Versatility in the characteristics of the leather is obtained through variation in the resin-forming compounds or the blocking agent.

Details of the Winheim-Doherty process were described in *Industrial and Engineering Chemistry* (August), a publication of the American Chemical Society.

Science News Letter, August 14, 1948

PUBLIC HEALTH

Consolidate Laboratories For War Against Disease

► THE FIRST STEP in consolidating the national headquarters of the communicable disease fighters of the U. S. Public Health Service was taken in Atlanta when Surgeon General L. A. Scheele accepted from Emory University a 15-acre plot of ground.

From the concentration of laboratories to be placed there teams of doctors and health experts will go forth when necessary to fight the menace of diseases spread by insects and animals.

Malaria is a major problem for the health forces under the command of Dr. R. A. Vonderlehr, since CDC, as the communicable disease control is called, began with the campaign against this mosquito-carried disease. Other diseases they are ready to handle, upon request of local and state authorities, include: yellow fever, infantile paralysis, encephalitis, hookworm, typhus, plague, sand fly fever, amoebiasis, schistosomiasis, filariasis, dengue fever, dysentery and other related infections.

Science News Letter, August 14, 1948

NUTRITION

Latest Breakfast Treat Is Cereal from Prunes

► THE LATEST addition to breakfast menus is a cereal made of prunes.

The new breakfast cereal, made from sieved prunes, was developed by the food technology division laboratories of the University of California in Berkeley. It is termed healthful, tasty, inexpensive and contains more than 50% dried fruit.

One method of making the cereal calls for making a dough of whole wheat flour, white flour, bran, corn sugar, yeast or baking powder and sieved prunes. The mixture is then baked in small loaves, sliced and dried. Finally the slices are crushed and sieved to "grape-nuts" size.

Science News Letter, August 14, 1948

GENERAL SCIENCE

"Statistical Blackout" Charged Against Soviets

► FACTS about the economic life in the Soviet are hidden from the rest of the world not by an "iron curtain" but by a "statistical blackout," a group of American scientists have charged.

The scientists are editors of *The American Statistician*, published by the American Statistical Association. They describe the "blackout" in an editorial (June).

Efforts of the Economic and Social Council of the United Nations to get a picture of present world economic conditions and future prospects are "severely handicapped" by lack of information from the U. S. S. R., the statisticians complain.

When the UN group prepared its "Eco-

nomic Report" without including Russia, the Soviets were the first to complain, the editorial explains. But when Prof. Arutiunian, the Soviet representative, did give his figures, they were little help.

Industrial output in the U. S. S. R., he reported, rose 32% in 1947 over the previous year. Just what this made the industrial output last year, or from what level it had risen from 1946, was not stated. Thus, the statisticians point out, "These figures are of little significance."

For our information on the economy of the U. S. S. R., the editorial continues, we must depend on "a small corps of experts on Soviet economy."

"These men combine economic and statistical competence with detective ability and highly developed imagination."

Their best sources of information, the editorial adds, are "apparent slips and inconsistencies in official Soviet data."

Science News Letter, August 14, 1948

GENERAL SCIENCE

Charge Military Seeking Custody of Atomic Bombs

► SOME MILITARY LEADERS are trying to gain custody of the U. S. stockpile of atomic bombs which were assigned to the civilian Atomic Energy Commission under the McMahon Act, an atomic scientist charged.

In a statement marking the third anniversary of the atomic bombing of Hiroshima, Dr. William A. Higinbotham, vice-chairman of the Federation of American Scientists in Washington, and a physicist at the Brookhaven National Laboratory, declared a battle over military or civilian control of the nation's atomic bomb stockpile is raging under a "cloak of secrecy."

Dr. Higinbotham said that some military men are arguing that atomic bombs are a weapon which should be in the hands of the military. This, the scientist cautioned, would make it "physically possible for military men to make the decision to use the atomic bomb and carry this decision into effect."

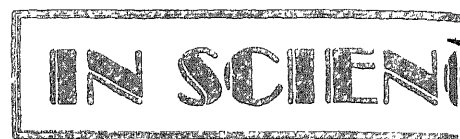
"A 'border incident' involving the use of an atomic bomb could not easily be smoothed by diplomacy," Dr. Higinbotham warned.

The Federation, the statement emphasized, feels that atomic bombs "should be retained firmly in the hands of the President and his advisers who have an overall picture of the international political situation."

Attacking secrecy, the scientist said that convenience and not security is to blame for the fact that the debate on control of the bombs has not been contested openly.

"The national security is certainly not endangered by making public the pros and cons of this issue, whether the bomb should be held by civilians or soldiers," Dr. Higinbotham said.

Science News Letter, August 14, 1948



AERONAUTICS

New Bomber Triumph in U. S. Warcraft Progress

► THE RECENT 6,000-mile test flight of the new Air Force giant bomber, the B-36, which took off at a gross weight of 300,000 pounds, indicates the American position in modern warcraft. So also is another new bomber just delivered to the Air Force, the speedy Martin XB-48, powered with six jet engines. (See SNL, Aug. 7.)

The B-36, which took off with the heaviest load ever taken aloft by an airplane, was built by the Consolidated Vultee Aircraft Corporation and is a giant in comparison with the big B-29 which brought the Japanese to their knees. It is said to be the world's largest land-based bomber.

It was designed to replace the B-29, being larger, faster and able to carry greater loads. In addition, it has much greater range. On this 6,000-mile test run it averaged 300 miles an hour and, with a lighter load, could have added another 3,000 miles to its trip. It can make a round-trip from America to central Europe without landing.

This giant bomber, with a bomb-carrying capacity of some 30 tons, is roughly 40% larger than the B-29. It made its first test flight in the summer of 1946. It has a wingspan of 230 feet, is 163 feet long, and has a rudder height of over 37 feet. It is powered with six 3,000 horsepower Pratt and Whitney engines mounted on the trailing edge of the wing which operate pusher-type propellers. The Air Force now has eight of these bombers and 94 are on order.

An important feature of the B-36 is its newly-developed four-wheel main landing gears which distribute its weight over a greater runway area than single-wheel or dual-wheel gears. Because of this it can operate from any base suitable to accommodate the B-29 Superfortress.

The XB-48, built by Glenn L. Martin aircraft company of Baltimore, is powered with six General Electric-Allison jet engines that give it a speed approaching 500 miles an hour. It has a combat radius of more than 800 miles. Its bomb-carrying capacity is over 10 tons. It has a wingspan of 108 feet and a length of 85 feet. A notable feature is its bicycle-type landing gear.

The new Consolidated-Vultee bomber has a brother cargo or troop-carrying plane. It is the C-99, which is capable of transporting 100,000 pounds of cargo or 400 fully-equipped combat troops. It has the same wingspan as its bomber counterpart but is higher and 19 feet longer. In speed and range it equals the bomber.

Science News Letter, August 14, 1948

THE FIELDS

AERONAUTICS

New U. S. Jet Fighter Is Black for Night Safety

► ADD "BLACKHAWK" to your aviation vocabulary. It is the official name of the U. S. Air Force's newest jet fighter, which is black in color to make it less visible at night and can swoop like a hawk with its four jet engines.

The new airplane is a product of Curtiss-Wright Corporation of Columbus, Ohio. An experimental version has undergone extensive tests at Muroc Base, Calif., and 88 planes of the type have been ordered by the Air Force.

This four-jet fighter, powered by Westinghouse engines, is officially the F-87 in military parlance. Its engines are grouped in pairs away from the fuselage on the wings. It operates with a two-man crew and is designed to be usable under extreme weather conditions. Among other equipment it has the most modern anti-icing devices. Its wingspan is 60 feet, and its length slightly greater. Its speed and range are not yet revealed.

Science News Letter, August 14, 1948

AERONAUTICS

New Antenna for Planes Eliminates Former Drag

► A NEW and unique antenna, for sending automatic or other radio signals from flying objects ranging from planes to rockets, lies flat in the surface of the object and eliminates the drag that is caused by ordinary projecting airborne antenna. An important application will be in planes designed to beat the speed of sound.

The new antenna consists of a rectangular notch cut in the tail surface of the test vehicle which will excite certain portions of these surfaces but will not affect their aerodynamic quality, it is explained by Ralph O. Robinson, Jr., of the Applied Physics Laboratory of Johns Hopkins University at Silver Spring, Md., where it was developed.

It is called a notch antenna, and was designed to provide a radiation pattern suitable for sending automatic radio signals from a test vehicle in flight without interference with its aerodynamic configuration, he states. To do this it seemed essential to use the vehicle's surface, or a portion of it, as the antenna rather than to use a trailing wire or other external structure.

The notch antenna has properties different from the conventional slot antenna and the usual aperture antenna. It consists of a rectangular opening in the leading or trailing

edge of a thin portion of the test vehicle structure. It projects into the surface with its long side perpendicular to the edge. It may be filled with suitable plastic material so that it conforms to the original shape of the surface and does not reduce its strength. The notch is fed by a coaxial cable from the transmitting instrument.

The size of the notch is measured in radio wavelengths rather than in the more familiar inches or meters. Its length may range from a quarter to a sixtieth of the wavelength under consideration. Its width is usually less than one hundredth of a wavelength. A single notch in a rocket or plane may be enough for a particular job, or two or more may be used as elements of directional antenna for certain applications.

Science News Letter, August 14, 1948

ELECTRONICS

Synthetic Quartz Crystals May Add to Vital Supply

► QUARTZ CRYSTALS, grown in the laboratory, may add to the supply of these crystals which are vital to radio communication and electronic apparatus.

These crystals are used in radio transmission and long-distance telephony because they can convert mechanical energy such as sound waves into electrical energy—and back again. During the war, tiny wafers of quartz, smaller than a postage stamp, were used to control the frequency of military radios. In the past this country has imported most of its raw quartz from Brazil.

Ernest Buehler and Alfred C. Walker of the Bell Telephone Laboratories told the International Congress of Crystallography at Harvard University how they had been able to produce quartz crystals more than an inch long in a month. They placed silica, a mineral which is found in sand, and a small quartz crystal in an alkaline solution inside a steel bomb. The bomb was then heated to 750 degrees Fahrenheit at a pressure exceeding 15,000 pounds per square inch.

Crystals produced in this way are not substitutes. They have the same composition as quartz crystals found in nature. Since they are grown under specially controlled conditions, they even tend to be superior to most natural crystals.

Experiments have been so successful, the Bell scientists said, that commercial production of quartz crystals in the near future seems likely.

Danforth R. Hale of The Brush Development Company of Cleveland told of experiments in which silica, a small crystal of quartz and water were placed in heavy pressure vessels at a pressure of several thousand pounds per square inch and cooked at a temperature close to that of a very hot flat iron. In one of these experiments the small crystal increased in size 12 times in about 60 days.

Science News Letter, August 14, 1948

MEDICINE

Plenty of Anti-Polio Drug At Hand in Epidemic Area

► PLENTY of Darvisul phenosulfazole, new anti-polio drug now getting clinical trials, is available for three medical centers in North Carolina for trials on polio victims during the current infantile paralysis epidemic in that state, a spokesman for Lederle Laboratories, American Cyanamid Company, said. Lederle Laboratories make the drug which is also undergoing trials in Texas, scene of another polio epidemic this season.

The medical centers in North Carolina are the Bowman Gray Medical School of Wake Forest College at Winston-Salem, the University of North Carolina Medical School at Chapel Hill, and Duke University School of Medicine at Durham.

Presumably the drug will be used not only for patients at these medical centers but also will be sent to physicians in other parts of the state who will cooperate with the medical centers in proper testing of the drug.

Science News Letter, August 14, 1948

PHYSICS

Atoms Are Pushed Out of Place in Smashed Metal

► IF YOU HIT a piece of metal with a hammer you are actually knocking the tiny atoms in it out of position.

Drs. B. L. Averbach and B. E. Warren of the Massachusetts Institute of Technology reported at the International Congress of Crystallography held at Harvard University that smashing metal broke up the arrangement of atoms in the material.

The scientists placed blocks of deformed and normal metal in an X-ray beam and measured the amounts of energy scattered in various directions by the atoms in the metal. The blocks that had been damaged scattered more energy in certain directions than the unharmed ones, indicating that groups of atoms in the metal had been broken up.

A metal which is so sensitive that even light shining on it will cause the atoms to rearrange themselves was described to the conference by a group of British and American scientists.

The metal, barium titanate, was discussed by H. F. Kay and R. G. Rhodes of the University of Cambridge, England; Elizabeth A. Wood, B. T. Matthias and G. C. Danielson of Bell Telephone Laboratories, and P. W. Forsbergh, Jr., of M. I. T.

Sensitive atoms of barium titanate show a remarkably quick response to the slightest changes in pressure, temperature or electricity. Although the substance is now classed as a laboratory curiosity, the scientists predicted that important applications may be found for its unique properties.

Science News Letter, August 14, 1948

ASTRONOMY

Wide-Angled Telescopes

These mighty candid cameras are being used to find out more about the Milky Way galaxy of which the earth is a part. Little is known of its appearance.

By MARTHA G. MORROW

► WIDE-EYED TELESCOPES, that take in large areas of the sky at a glance, are exploring the Milky Way system of stars to which our sun and earth belong. These mighty candid cameras of the heavens produce astronomy's best images of near and distant stars.

This newest family of telescopes is also useful in tracking the flight of V-2 rockets. Conceived less than two decades ago by the late Bernhard Schmidt, German instrument maker, further improvements have been added by the brilliant optical designer, Dr. James G. Baker of Harvard University. The most advanced of this new kind of telescope, the Baker-Schmidt, is now under construction.

"Schmidt telescope-cameras are contributing largely to the solution of some of the most urgent present-day problems in astronomy," stated Dr. Harlow Shapley, director of Harvard Observatory where pioneering research on our Milky Way galaxy is being conducted. "We are finding out what kind of universe we belong to and where we are headed," he said.

Central Plane

The bright, star-studded band of the Milky Way visible any clear night outlines the central plane of our own star-system. A hundred billion stars or more belong to it.

Milky Way dimensions are not astounding by astronomical yardsticks, but very large by earthly standards. Some stars in our own Milky Way universe are so far away that the starlight which reaches us these summer nights started on its way ten to twenty thousand years ago.

As yet we know little about the appearance of our own galactic system. Being on the inside looking out, we can only guess that it is spiral in shape. Our sun is located in a cloud of stars in the outer part of the system, well beyond the main body of the spiral.

We are far from the galaxy's dense central cloud of stars, nebulae and other luminous material. There may even be a relatively star-empty region between us and the center of the Milky Way galaxy.

More observations are needed to settle this and other questions about our near neighbors in space. The family of Schmidt telescopes will be the explorers in this project, making available the information we need.

Instruments of this type, rarely used for

visual observation, are notable because they produce superb images over a relatively large area. On a photographic negative they record a portion of the sky as much as a hundred times larger than the photographs taken with a large reflecting telescope. They have great speed, so many pictures can be made on a single clear night. They are less sensitive to atmospheric disturbances than the long-focus reflectors.

Not only are these telescope-cameras important in exploring the heavens, but modified forms are used for studies closer at hand. Schmidt-type instruments, by tracking V-2's and other rockets in flight, will help protect us against guided missiles of the future. As a projecting system, this arrangement has been found useful in television reception.

Unpredictable Happenings

Comets, exploding stars and other outstanding but unpredictable happenings of the heavens can best be detected with such telescopes. It was with a Schmidt that astronomers found a large red nebula, first of its kind. Also two supernovae, the 16th and 17th known to the world of astronomy, were spotted within a fortnight of each other with such an instrument.

Although invented comparatively recently, 40 to 50 members of this family of telescopes are already in existence.

When the four-foot Schmidt at Palomar Mountain, Calif., swings into action late this summer, it will be the largest in operation. It has a 72-inch spherical mirror, thus is much larger than the 48-inch aperture might indicate.

In some ways this instrument has excited astronomers as much as its greatly publicized partner, the 200-inch Hale telescope of the California Institute of Technology and the Carnegie Institution of Washington. The two telescopes are not competitors: each will be far more effective because of the other. The Schmidt, for instance, is excellent for patrolling the heavens and can pick out objects worthy of the "big eye's" time.

The Mexican National Observatory at Tonanzintla boasts a Schmidt telescope with a 26-inch lens, made with Harvard's cooperation. Telescopes of this type with 24-inch correcting lenses are also located at the Oak Ridge observing station of the Harvard College Observatory and the Case Institute of Technology in Cleveland.

A telescope for Harvard's South African Observatory at Bloemfontein is under construction. Its mirror and correcting plate

will both be 60 inches across. Several other large Schmidts are in the making and still others are in the planning stage.

The Schmidt camera is neither a reflector nor a refractor, but rather combines the two since it employs both a mirror and a lens. The first ones used in this country were built by amateurs, though many observatories today have professionally made instruments.

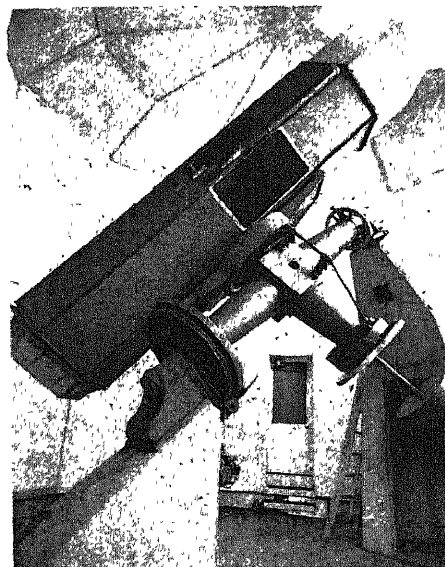
The ordinary reflecting telescope focuses the rays of light from a star by means of a mirror of special design. Rather than being sphere-shaped, it is a paraboloid.

Rays Bent by Lens

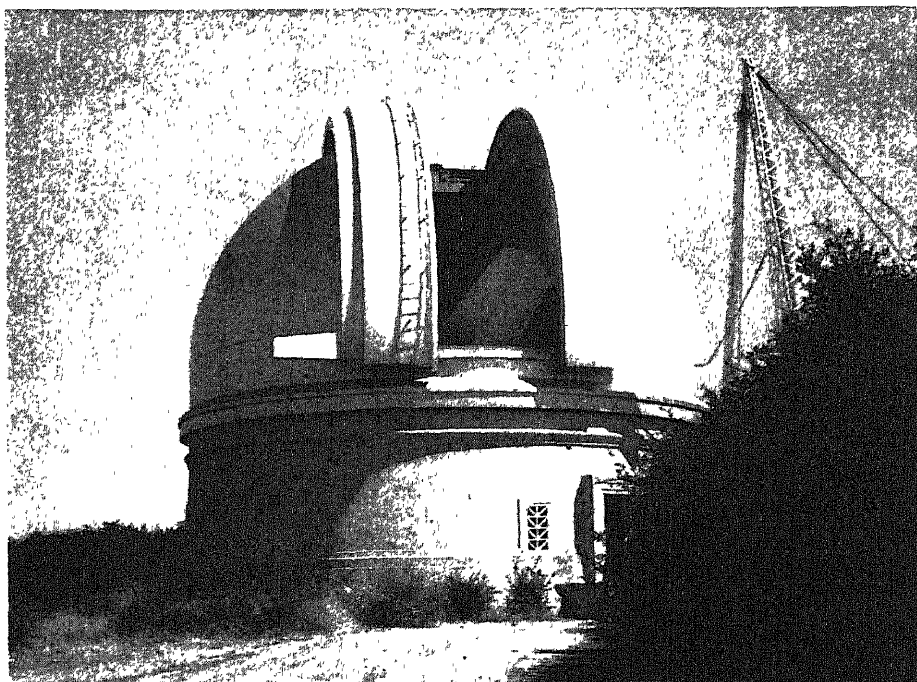
Bernhard Schmidt of the Hamburg Observatory at Bergedorf, Germany, hit upon the idea of placing a specially figured lens far in front of a spherical mirror. Light rays entering the telescope are bent by this lens, before they strike the mirror, in such a way that all are brought to a focus at about the same point.

The correcting lens is partly convex and partly concave. The center is raised as is the edge of the thin disk, while the region in between is slightly depressed. This lens is so thin that the hump in the middle is hardly visible to the unaided eye.

The combination of correcting lens and spherical mirror produces images without distortion out to the very edge of the plate. But the rays which fall near the edge have the same focal length as those that pass near the center. So the photographic film,



CORRECTING LENS—It measures 24 inches across and is part of Harvard Observatory's Schmidt, the mirror of which is 33 inches in diameter.



SCHMIDT DOME—Tube of the 48-inch Schmidt telescope-camera is visible within the dome atop Palomar Mountain.

placed halfway between the mirror and correcting lens, must be bent back a little to give sharp images.

Although a number of ingenious suggestions have been made to improve the Schmidt telescope, those of Harvard's young Dr. Baker are considered the most promising. His advanced design will reduce the length of the telescope and also eliminate the need for curving the plate.

Dr. Baker suggests that a second mirror be inserted within the telescope system. Under the new set-up, light entering

through the correcting lens proceeds to the concave spherical mirror, is reflected back to a convex spherical mirror which reflects it to the film. The second mirror straightens out the light rays so that a sharp image is produced on a flat photographic plate or film.

A telescope of the modified Baker-Schmidt type, the first of its kind to be built, is now under construction. It will have a 32-inch correcting plate and 36-inch primary mirror. The second convex mirror is 17 inches in diameter.

ASTRONOMY

Giant World Telescopes

► THE MAJORITY of the world's most powerful telescopes are located in the United States. This list of the "giants" includes their size, when completed, where located, and by whom operated.

Outstanding among the reflecting (mirror) telescopes are:

200-inch, 1948, Palomar Mountain, Calif., California Institute of Technology and the Carnegie Institution of Washington.

120-inch-to-be, Mt. Hamilton, Calif., Lick Observatory of the University of California.

100-inch, 1917, Mt. Wilson, Calif., Mount Wilson Observatory of the Carnegie Institution of Washington.

82-inch, 1939, Mt. Locke, Tex., McDonald Observatory of the Universities of Texas and Chicago.

74-inch, 1948, Pretoria, South Africa, Radcliffe Observatory.

74-inch, 1933, Richmond Hill, Ontario, David Dunlap Observatory of the University of Toronto.

72-inch, 1919, Victoria, British Columbia, Dominion Astrophysical Observatory.

69-inch, 1932, Delaware, O., Perkins Observatory of Ohio Wesleyan University.

Large refracting (lens) telescopes include:

40-inch, 1897, Williams Bay, Wis., Yerkes Observatory of the Universities of Chicago and Texas.

36-inch, 1888, Mt. Hamilton, Calif., Lick Observatory of the University of California.

32.7-inch, 1889, Meudon, France, Observatory of Paris.

31.5-inch, 1899, 1916, Potsdam, Germany, Astrophysical Observatory.

30-inch, 1914, Pittsburgh, Allegheny Observatory of the University of Pittsburgh.

Idea for Telescopes First Used for Lamp

Astronomy's most promising "big baby" among telescopes, the Schmidt-type instrument, might have been born about 20 years earlier. A similar arrangement, in reverse, was applied to searchlights by an American inventor. But it had to be applied to photographing the sky later.

In 1910 the late Dr. Gustav A. Hermann Kellner was granted patent No. 969,785, which he assigned to the Bausch and Lomb Optical Company, on "A Projecting Lamp." Essentially a reverse-Schmidt, no claim was made that this same type of system could be used in photography.

Later in Germany the Schmidt telescope-camera was developed.

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Scheduled to be completed within another year, this telescope-camera will be located at Harvard's South African station. It is to be operated jointly by the Armagh Observatory of Northern Ireland, the Dunsink Observatory of Eire, and Harvard Observatory.

The center of our Milky Way system is located in the constellation of Sagittarius, the archer. These star clouds are favorably located for studies at observatories in the Southwest United States, in Mexico, and especially in South Africa. They pass directly overhead at Harvard's Boyden Station at Bloemfontein, South Africa, where two of the world's largest Schmidts soon will start exploring them.

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30-inch, 1886, Nice, France, Bischoffsheim Observatory of the University of Paris.

Outstanding among wide-angle Schmidt camera-telescopes are:

60-inch-to-be, Bloemfontein, South Africa, Harvard College Observatory.

(Continued on p. 108)

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SUFFERN, N. Y.

Do You Know?

Persons can obtain *calcium* from milk, kale, collards, yellow cheese, mustard greens and turnip greens.

Disturbing *noises* of all kinds, from barking dogs to train whistles and flying planes, are being muffled by law in many American cities.

The 18-8 designation for stainless *steel* followed the discovery that a proportion of 18% chromium and 8% nickel in the steel was ideal for a great variety of steel products.

Mine-water problems in the Pennsylvania hard-coal region are of long standing but are growing worse; the average anthracite mine now pumps out about 13 tons of water for every ton of coal removed in comparison with an 8-1 ratio 25 years ago.

Hair molecules are long chains of atoms strung together with cross links, a scientist explaining the so-called *permanent wave* stated; in the waving process the cross links are broken, the hair formed into suitable shape, and cross links re-established

48-inch, 1948, Palomar Mountain, Calif., California Institute of Technology and the Carnegie Institution of Washington.

48-inch-to-be, Upsala, Sweden, University Observatory.

32-inch Baker-Schmidt, scheduled for 1950, Bloemfontein, South Africa, Armagh Observatory of Northern Ireland, Dunsink Observatory of Eire and Harvard Observatory.

26-inch, 1942, Tonanzintla, Mexico, Mexican National Observatory.

24-inch, 1941, Oak Ridge, Mass., Harvard College Observatory.

24-inch, 1941, Cleveland, Case Institute of Technology.

Complete list of existing large telescopes is found in the appendix of *Telescopes and Accessories* (Blakiston Co.) by George Z. Dimitroff and James G. Baker.

Science News Letter, August 14, 1948

ISLAND LIFE in Lake Michigan

by Hatt, Van Tyne, Stuart, Pope and Grobman

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AERONAUTICS-METEOROLOGY

Flying in Thunderstorms

➤ A STROKE OF LIGHTNING which hits an airplane flying through a thunderstorm usually does little physical damage to the plane itself but is rated as one of the greatest psychological hazards to the pilot.

The brilliant flash of the discharge, the smell of pungent ozone, the accompanying noise and concussion may frighten even the most experienced pilot, Maj. Gen. H. M. McClelland, U. S. Air Force, Commanding General of the Airways and Air Communications Services, declared. The general spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over stations of the Columbia Broadcasting System.

If the flash occurs at night and the pilot is temporarily blinded, he might find himself trying to fly instruments and seeing nothing but blurred gauges; in heavy turbulence that is not contemplated with any enthusiasm, he added.

The general summarized experiences and lessons learned in a recent Thunderstorm Project carried out in Florida and an Ohio-Indiana area as a joint undertaking by the Air Force, the Navy, U. S. Weather Bureau, National Advisory Committee for Aeronautics, with the Civil Aeronautics Administration and the Civil Aeronautics Board cooperating. The findings are of value to both military flying and civilian air transportation.

In these thunderstorm investigations, airplanes played an important part. Black Widow Night Fighters of the Air Force were used because of their rugged design. When an approaching storm was located by radar, a number of planes took off and entered the storm, stacked at 5,000-foot intervals from 5,000 to 25,000 feet in altitude.

They were equipped to record on film the data of special instruments for measuring the extent and speed of the great updrafts and downdrafts, in addition to the smaller-scale but violent turbulence and sharp accelerations encountered in the storms. They also carried instruments for measuring temperature and electrical field, and were equipped with radar.

During the thunderstorm seasons in Florida and Ohio 150 thunderstorm days were studied, and 1,363 airplane flights were made through them. During these 1,363 flights, planes were struck by lightning 21 times. No major damage was done to the aircraft. However, lightning strikes burned off radio antennas and static discharge wicks, drilled holes up to the size of a dime in wing tips, rudders and elevators.

In addition to the use of planes in the thunderstorm studies, swarms of balloons, a surface microneut and radar were used. All four components worked together as a coordinated team. The balloons gave additional details on thunderstorm structure and circulation. Some were followed by

radar, others were equipped with transmitters and were followed by radio direction finders. The microneut consisted of 55 ground stations, each equipped with many types of weather recording instruments. Radar followed planes and balloons in flight.

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INVENTION

Golfers Taught to Hold Heads Steady by New Device

➤ GOLFERS all know that not moving your head wrong has as much to do with the success of a stroke as moving the club's head right. But correction of that fatal tendency to raise your head, or to move it right or left, isn't easy unless you have some way of knowing which way you move it, and how much.

This is just what a new device, invented by A. M. Newman and R. V. Miller of Los Angeles, undertakes to do. The golfer first takes a correct stance, presumably under the direction of his "pro." Then a band is slipped around his head, and a cord led from this to a box of electrical gadgets before him on the ground.

When he makes his practice swing, flashing lights of three different colors—red, green and white—will tell in which direction his head moved. Buzzers are also rigged, to give mechanized Bronx cheers in three different tones, according to what he does wrong. If he does two wrong things at once, like raising his head and moving it to the right, he gets it double.

U. S. patent 2,445,839 has just been issued on the new mechanized golf instructor.

Science News Letter, August 14, 1948

Science Service Radio

LISTEN in to a discussion on research upon feelings and emotions on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDST Saturday, Aug. 21. Watson Davis, director of Science Service, will have as his guests Dr. Martin L. Reymert, director of The Mooseheart Laboratory for Child Research, Mooseheart, Ill., and Malcolm R. Giles, executive director of the Loyal Order of Moose. They will report current findings in the application of psychology to everyday life, giving a forecast of the Second International Symposium on Feelings and Emotions to be held in Mooseheart and Chicago, Oct. 28-30.

Science News Letter, August 14, 1948

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Anyone can learn about growing things and some of the principles of agricultural science by experimenting with this kit. The plants you raise will not lower the high cost of living but they will increase the pleasure of learning. Send for this kit today so you can get started on soilless gardening as a hobby.

Young and old alike will enjoy this complete outfit for hydroponics. There is nothing else to buy. It contains everything needed to start growing fruits and flowers. Pots are easily assembled, chemicals to feed growing plants, shiny mica material for roots to cling to, seven kinds of specially selected seeds. Grow seedless fruit, sprout roots on stems, experiment with colorful plastic tents for light-growth.

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ABOUT COSMIC RAYS—John G. Wilson—*Sigma*, 144 p., illus., approx. \$2.65. Written by a British author for the general reader.

AUSTRALIAN JOURNAL OF SCIENTIFIC RESEARCH, SERIES A, PHYSICAL SCIENCES: VOLUME 1, NUMBER 1—N. S. Noble—*Council for Scientific and Industrial Research*, 119 p., illus., \$5.00 per year, \$1.25 single copy. A new medium for the publication of research papers regardless of the country of origin.

AUSTRALIAN JOURNAL OF SCIENTIFIC RESEARCH, SERIES B, BIOLOGICAL SCIENCES: VOLUME 1, NUMBER 1—N. S. Noble, Ed.—*Council for Scientific and Industrial Research*, 162 p., illus., \$5.00 per year, \$1.25 single copy. A new journal devoted to reports of research in various fields of biology. Subscriptions to these two journals should be sent direct to the publisher, 314 Albert Street, East Melbourne, C. 2, Victoria. It may be necessary to pay postage on foreign subscriptions.

THE HARLEM HOSPITAL BULLETIN: Volume 1, Number 1—*Harlem Hospital Clinical Society, Inc.*, 44 p., illus., quarterly, \$2.00 per year, single copies 50 cents. The papers included will not be limited to any specialty nor to members of the hospital staff. Correspondence should be addressed to Mrs. Arthur H. Aufses, Editor, Harlem Hospital, 136th St. and Lenox Ave., New York 30, N. Y.

FOODS: PRODUCTION, MARKETING, CONSUMPTION—Jean J. Stewart and Alice L. Edwards—*Prentice-Hall*, 2d ed., 490 p., illus., \$6.35. For those concerned with providing food for families, institutions or communities as well as for students of home economics.

HANDBOOK OF SCIENTIFIC AND TECHNICAL SOCIETIES AND INSTITUTIONS OF THE UNITED STATES AND CANADA—Callie Hull, S. J. Cook and J. R. Kohr—*National Research Council*, 5th ed., 371 p., \$5.00. Useful information about 1,302 organizations in the United

States and 166 in Canada, alphabetically arranged by name of society.

HOW TO CHOOSE AND USE YOUR WASHING MACHINE—*Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture*, 16 p., illus., paper, free upon request to U. S. Department of Agriculture, Washington 25, D. C. Useful advice to owners and prospective owners of washing machines.

HUMAN NUTRITION—V. H. Mottram—*Williams & Wilkins*, 151 p., illus., \$2.75. Of British origin, this book is intended to meet the crying need for training in dietetics in this "fearsome period of austerity for almost the whole globe."

PREVENTING AND REMOVING MILDEW—HOME METHODS—Margaret S. Furry—*Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture*, 10 p., illus., paper, free upon request to U. S. Department of Agriculture, Washington 25, D. C. Timely and authoritative counsel on treatment of textiles, upholstered furniture, books, leather, and other household goods.

SECOND REPORT TO CONGRESS ON THE UNITED STATES FOREIGN AID PROGRAM FOR THE PERIOD ENDED MARCH 31, 1948—Department of State—*Govt. Printing Office*, 138 p., illus., paper, 35 cents. Tucked in among the facts and figures of this official report is a letter from 8-year-old Anne-Marie Pocreau of France saying "thank you to all the Americans whom we like very much."

STRUCTURE OF TYPICAL AMERICAN OIL FIELDS: Volume III: A Symposium on the Relation of Oil Accumulation to Structure—J. V. Howell, Ed.—*American Association of Petroleum Geologists*, 516 p., illus., \$4.50. This volume includes fields that are in some way unusual, either in size, type of structure, discovery method, location or significance.

WASHINGTON WITCH HUNT—Bert Andrews—*Random House*, 218 p., \$2.50. The case of Mr. Blank who was discharged from the State Department as a "potential security risk" without being told what charges were brought against him is something to alarm every U. S. citizen. The threat to fundamental liberties in this and other cases is reported here by Pulitzer prize winner and chief of the Washington Bureau of the New York Herald Tribune.

Science News Letter, August 14, 1948

ELECTRONICS

Synthetic Mica Suitable For Communications

➤ **MAN-MADE MICA**, with the electrical characteristics of natural mica, is now being produced in the United States, it was revealed by the U. S. Army and the Navy. Both had a hand in the research program which developed the new synthetic product.

Great quantities of mica are required in America each year in many types of electrical equipment, particularly in condensers and other circuit elements. It is used in large amounts as insulation in electrical

machinery and as a dielectric in electronic circuits. It plays a big part in radio and radar. No domestic deposits of suitable mica have yet been found in America large enough to meet the needs. The volume supply in the past came principally from India and Brazil. The new synthetic may make further importation unnecessary.

The interest of the Army and the Navy in the development of a mica substitute is due to the fact that both are large users of this material in their communications and other equipment. They rate mica as a strategic mineral, one necessary to stockpile for future emergencies if there were no substitute.

Known as fluorine-phlogopite mica, the new synthetic is now being produced on a pilot-plant scale. It has the desirable characteristics of natural mica, including perfect cleavage into thin sheets, good electrical and mechanical properties, and chemical stability. It is expected to replace the muscovite and phlogopite forms of natural mica, the silicate minerals that the United States has been importing in large quantities.

Considerable work has been done in the past few years looking toward the development of a synthetic mica or a mica substitute. Government-sponsored research on mica synthesis was initiated at the Colorado School of Mines in June, 1946, under an Army Signal Corps contract. Later the U. S. Bureau of Mines began synthetic mica pilot-plant work at Norris, Tenn., under a contract with the Office of Naval Research. Owens-Corning-Fiberglas Corporation, serving under a consulting contract, furnished accumulated information gathered in two years of research, in 1945-46, in a mica synthesis program. Other groups also assisted.

Science News Letter, August 14, 1948

VETERINARY MEDICINE

Brucellosis Attacks Many Veterinarians

➤ **A WARNING** that the entire veterinary medical profession is threatened by a disease of animals has been sounded by Dr. Thurman B. Rice, professor of public health at Indiana University.

Dr. Rice reports statistics show that half of the veterinarians engaged in large-animal practice have had brucellosis, known as undulant fever in man.

In the central-west, he estimates that as many as 90% of the veterinarians have the disease or have had it.

Hogs are rated the most dangerous source of infection, but cattle, goats, sheep, horses and occasionally dogs may pass on the disease. The germ enters the human body not only through a skin abrasion or the membrane of the eye but also through normal skin.

Research workers handling infected animals "are nearly sure to get the disease," Dr. Rice warns.

Science News Letter, August 14, 1948

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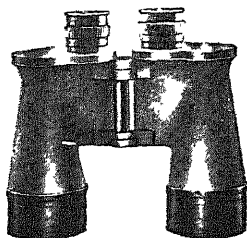
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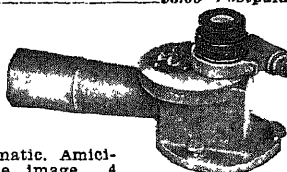
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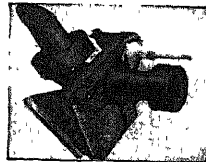
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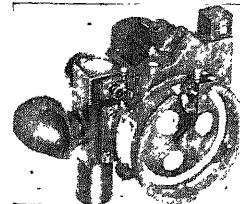
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⚙️ **FULL-VIEW GOLF** bag, about one-third the length of ordinary bag, is made of lightweight plastic and aluminum and has slots for 12 clubs with the shaft of each held firmly in a separate space by means of a locking mechanism. Clubs do not touch each other, and the one wanted can be released from its lock by a finger flick.

Science News Letter, August 14, 1948

⚙️ **ADHESIVE PLASTER**, which can remain on the body of a patient for long periods without irritating the skin, contains two fatty acid salts: zinc propionate and caprylate, respectively. These substances combat the growth under the plastic of bacteria which cause the irritation.

Science News Letter, August 14, 1948

⚙️ **CLOTH CUTTER**, for home dress-makers, is a "pinkie" that cuts without a blade and never needs sharpening. It produces a non-raveling bias-cut zigzag by means of two steel disks, instead of by shears, with rotary action worked by conventional scissors handles.

Science News Letter, August 14, 1948

⚙️ **FLIPPER, FOR PANCAKES**, meatballs and eggs, shown in the picture, re-



sembles the ordinary kitchen article but turning is accomplished without twisting the wrist. Thumb pressure on a lever rotates the patty-holding end of the flipper, turning it upside down.

Science News Letter, August 14, 1948

⚙️ **CAKE CUTTER AND SERVER**, usable with cheese and other foods, is a keen-edged knife with a blade that curves backward near its extremity, bearing fork-like tines at its end. The short flat-tined fork prevents the food from splitting while being transferred to a plate.

Science News Letter, August 14, 1948

⚙️ **DESK-TYPE FACSIMILE** machine permits the sending and receiving of telegrams direct from the executive's desk. The outgoing message, written or typed, is placed on the cylinder of the typewriter-sized machine, a button pressed, and electrical impulses, transmitted as a stylus passes over the copy, flash over the wire to make an exact pictorial reproduction at the receiving end.

Science News Letter, August 14, 1948

⚙️ **IMPROVED CARBINE** for general hunting has a hinged forearm at the front end of the stock under the barrel which can be turned down to form a five-inch grip or rest. It snaps up instantly for carrying or for use as a convenient firearm. This 37-inch carbine of .22 caliber is similar in design to the Army's M-1 carbine.

Science News Letter, August 14, 1948

• Nature Ramblings by Frank Thone •

➤ **GRASSES**, among the meekest of all the world's green folk, at last receive their meed of praise: the entire Yearbook of Agriculture for 1948, newly published by the U. S. Department of Agriculture (\$2), is devoted to them and their manifold uses. Several scores of scientists in the Department and elsewhere have contributed to its chapters, under the general editorship of Alfred Stefferud.

The seeming meekness of the grasses is deceptive, it appears from an examination of the important chapter by Mrs. Agnes Chase, one of the world's leading researchers on grass botany. Grasses evolved late, at about the time when hoofed mammals were beginning to become important on earth. Their flowers are small, lacking the conspicuous petals and sepals of more easily recognizable blossoms; hence they have been put near the bottom of the botanical scale by earlier classifiers of plants. But this

The Blessed Meek



turns out to be a simplicity of efficiency; stripping away all non-essential parts has enabled grasses to do their business in the world with most amazing success.

Grasses, Mrs. Chase points out, pioneer into the toughest situations. They are the

outmost seed plants in polar regions; only the far more primitive lichens and algae go beyond them. They hold the drifting sands of dunes, the shifting and eroding soils of gulleys and the cuts, fills and other man-made wastelands created by engineering works. The big, tough kind known as cordgrass has built millions of acres of shorelands out of what were once tidal flats, the sport of the sea.

Grasses, the other writers remind us, in chapter after chapter, have their impact on man's life in a hundred ways. They feed his livestock in pasture and from the silo, they beautify his parks and lawns, they give a footing to his sports from football to golf. Finally, as corn, wheat, rye, barley, rice and sugarcane, they feed him; and as bamboos they offer materials for furniture and tropical housing.

Science News Letter, August 14, 1948



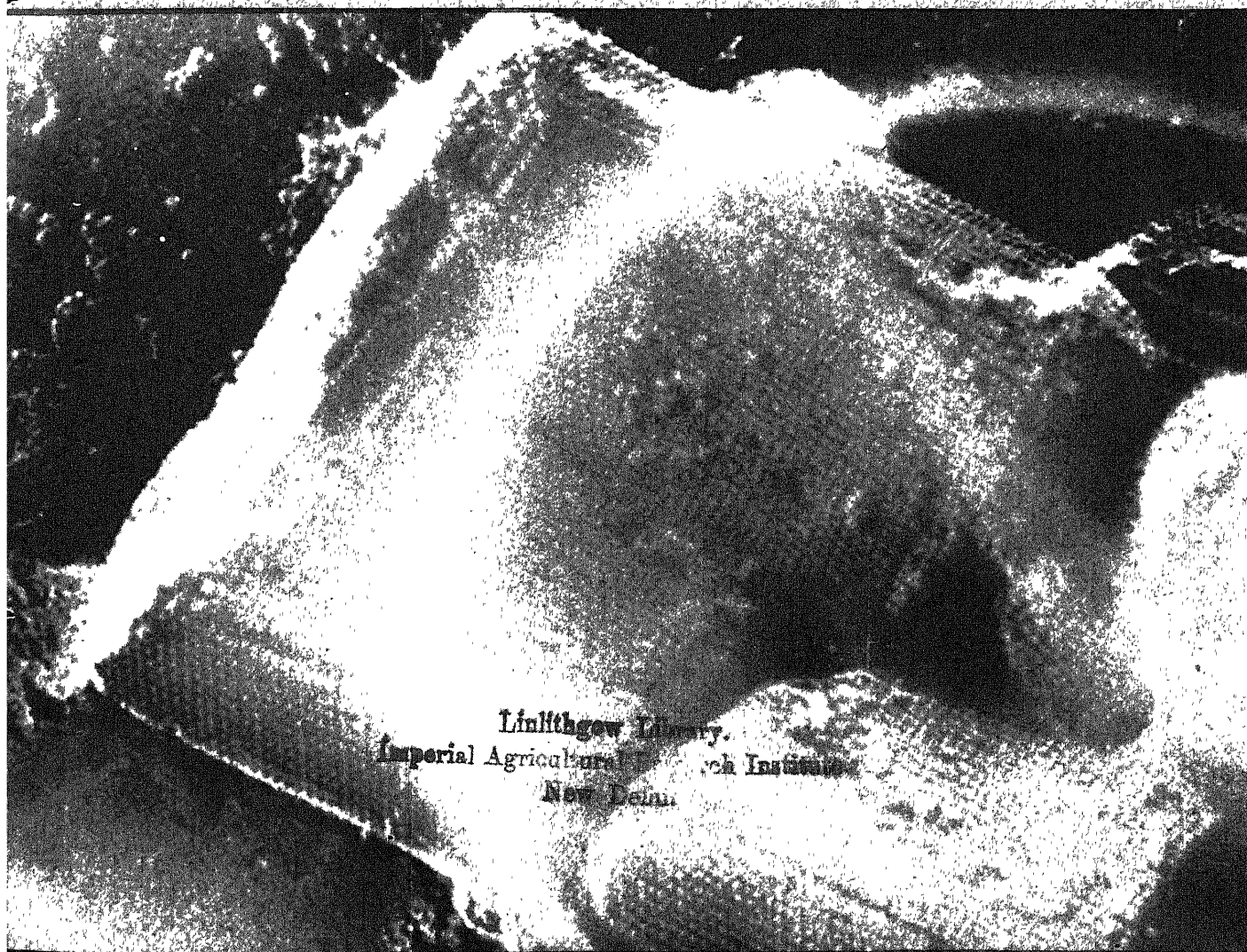
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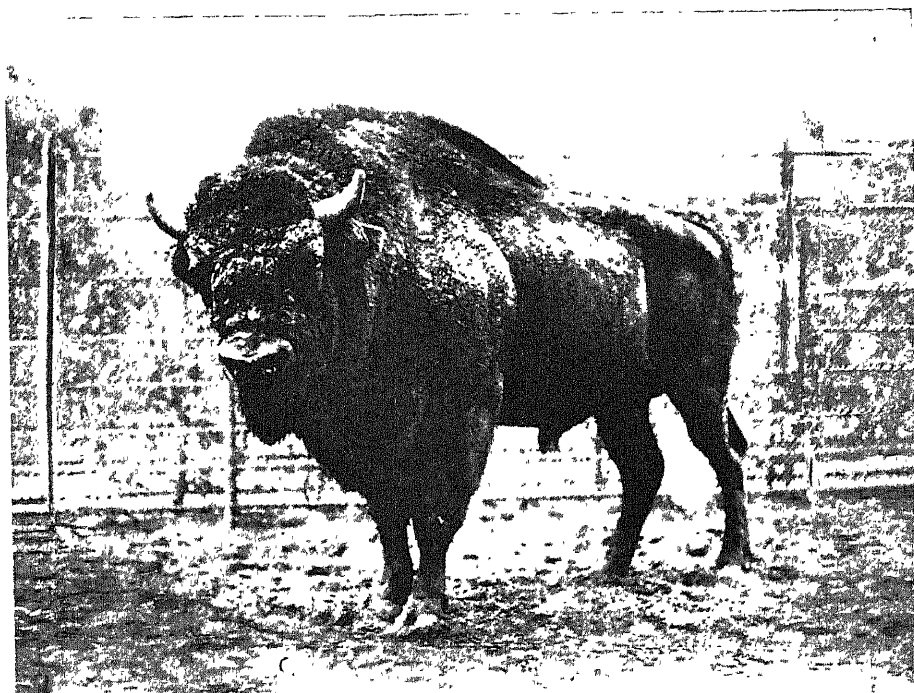
Molecules Of Virus

See Page 126

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EUROPEAN BISON—This animal is larger than his more famous American cousin, but his species is now reduced to a mere 93 pureblood head.

GENERAL SCIENCE

Foundation Bill Fails

Hope for enactment of a science foundation bill is again frustrated with the recent adjournment of Congress. This marks three straight years of failure.

➤ **SPEEDY ADJOURNMENT** of Congress has killed hopes that a national science foundation might be set up this year.

The foundation has been proposed as a civilian agency to direct government support of basic science in fields outside the realm of the Atomic Energy Commission. It has been termed a "must" for three years by leaders in science, education and the military.

But legislation for the foundation has failed to become law for three straight years. In 1946, the Senate passed a science foundation bill, but the House failed to act. Last year, President Truman vetoed a foundation bill at the end of a session.

Bills believed to meet the administrative objections raised in the President's veto statement were introduced in both the House and Senate early this year. The Senate passed it, for the third straight year, but the measure died in the House.

A move to get it enacted by the House with unanimous consent was blocked by an objection from Rep. Robert F. Rockwell, Rep., Colo. The bill, brought out of the Committee on Interstate and Foreign Commerce late in the session, did not come up for debate on the floor of the Lower Chamber.

When President Truman called Congress back into session July 26, he urged a national science foundation among his secondary requests. No action was taken on the bill during the short session. The yet-to-be-established foundation even came in for a recommended \$15,000,000 in the budget submitted last January.

Meanwhile, no one seems to be opposed to the foundation itself. Some of the details have been controversial, but no open attack on the establishment of the foundation has been made.

The foundation was first suggested by the scientists who directed the mobilization of science in World War II. They envisioned it as a peacetime successor to the famed Office of Scientific Research and Development. It was originally proposed that it would take over from OSRD, which has long since closed shop. The job which the foundation was expected to do has fallen to other government agencies, particularly military organizations such as the Office of Naval Research.

Three years after the end of the war, the foundation which was to play a major role in government aid to postwar science has not been started.

Science News Letter, August 21, 1948

WILDLIFE

European Bison May Have Chance of Survival

➤ **EUROPEAN BISON**, a species distinct from and larger than the more familiar American bison, have a bare chance for survival as a species. First general stock-taking since the war shows the existence of 93 animals, 50 of them cows. The first postwar pedigree book has recently been published by the International Society for the Protection of the European Bison, under the editorship of Dr. Jan Zabinski, director of the Warsaw Zoological Park.

Only animals known to be pure-bloods of the European species are listed in the book; the rather numerous hybrids with the American bison are excluded. Eleven specimens in Germany constitute a borderline case, since they might have an admixture of American bison blood.

Possible value of the European-American hybrids in restoring the European bison species is not excluded, though these animals will not be used for that purpose unless the need becomes evident. A prewar project, promoted mainly in Germany, called for breeding mixed-blood cows only to European bulls, thus gradually increasing the proportion of European blood in successive generations of offspring until practically no American bison strain was left in them. This procedure was known in German as "Verdraengungszucht," or suppression-breeding.

Places where European bison may be bred in Europe now number nine, with three in Poland, two each in Germany and Sweden, and one each in the Netherlands and the USSR. There are also a few animals on the estate of the Duke of Bedford, in England.

The European bison, or zubr, as the animal is also called, once ranged in great numbers over the entire continent and well into Asia, as its images on ancient Mesopotamian cylinder-seals testify. It was a prime game animal throughout antiquity, known until late Roman times in Gaul and in the forests of the Rhine and Danube.

With the advance of civilization during the Middle Ages, and the increase of population in Europe, its numbers dwindled, though at least two numerous herds survived into recent times, one in eastern Poland, at Bialowiez, the other in the wild lands of the Caucasus. During the time of anarchy and hunger after the first World War the latter herd was practically exterminated, but a few animals survived of the Polish group.

This small herd at Bialowiez is still one of the breeding nuclei. There they have been joined by the handful of animals representing the only survival of the Caucasian strain. Breeding is now carefully controlled, not only to insure if possible the survival of the European bison as a species but to preserve the different strains within the species.

Science News Letter, August 21, 1948

INVENTION

Inventors' Ideas Needed

Armed Services are asking help in solving many technical problems which affect national defense. Their needs reach into many fields of science.

► HERE ARE SOME THINGS the Armed Services need:

Storage batteries for the Polar regions.
Smoke-producing mixture that will ignite and burn on wet ground.

Non-detectable ground mine.

New types of rocket propellants.

Improved metals.

Pneumatic tire substitute.

A bolt or cap screw that can be operated without the usual amount of turning.

New, non-magnetic compass.

Handwheels for vehicles that do not chill the operators' hands in cold weather.

These are only a few of several hundred technical problems affecting national defense which the Armed Services are asking help in solving. They are taken from an official list issued by the National Inventors Council, U. S. Department of Commerce. These lists are for circulation among inventors, in the hope that individuals will submit solutions or suggestions that may solve the problems.

All ideas and suggestions submitted to the Council are carefully screened by experts. When a proposal appears to be of constructive value, the Council refers it to the appropriate technical branch of the Armed Services for study. The judgment of the technical branch to which the matter was referred is communicated to the inventor as soon as possible.

Needs of the Armed Services reach into many fields, from those that might be solved by an ingenious mechanic to others that require the training and experience of high-grade research scientists. In the latter fields there are problems for chemists, metallurgists, physicists, engineers, mathematicians, aircraft experts and others.

In the fuel and lubricant field there is need for a diesel fuel oil which will not lose its physical and chemical characteristics at 65 degrees below zero Fahrenheit. There is need for lubricating oil which will maintain satisfactory viscosity and have a pour point of approximately minus 60 degrees Fahrenheit. Listed as an unsolved problem is the solidification of gasoline in order to improve packaging, transportation and storage under minimum temperatures of minus 65 degrees Fahrenheit.

A new type of electric storage battery, or improvements on present types, is essential to give efficient service under any climatic conditions within a temperature range of 130 degrees Fahrenheit above zero to 65 degrees below. It should not reflect any appreciable reduction in voltage and efficiency due to low temperatures. Applications range from locomotives to highway

vehicles and stationary engines.

For chemists to solve is the problem of a red tracer composition for artillery shells which will stand high velocities, function uniformly for any number of seconds, and is not affected by heat or moisture. Then there is the problem of an igniting composition which is not affected by heat or moisture with uniform action under all conditions of ammunition use. In addition, plastic materials for many uses under various climatic and other conditions are required.

For metal experts many problems remain to be solved. There is need for an easily worked alloy which will withstand temperatures above 5,000 degrees Fahrenheit; a satisfactory ceramic liner for rocket motors; non-corrosive metals; anti-friction bushings; a non-corroding, penetrating, alloying treatment for magnesium; and light alloy materials which will retain strength at temperatures up to 1,000 degrees Fahrenheit.

Unsolved problems in the Council list reach into nearly all branches of science. Electronic equipment of various types

might be mentioned. For mechanics there is the job of inventing a hydraulic jack that will not leak off under load or bind when operated to lower the load. Also wanted is a telescoping screw for elevating mechanisms, a substitute for the present wheel-brake system, and an air-brake system requiring only one hose.

The National Inventors Council has nothing to do with placing development contracts with private firms and laboratories for the solution of technical problems. It advises those interested in development contracts to discuss the matter directly with the Armed Services. The Council seeks only to bring the problems to the attention of individual inventors whose constructive thinking on them might not otherwise come to light.

For the convenience of inventors, the Council publishes from time to time lists of needs of the Army, Navy and Air Force. However, some of the problems confronting the Armed Services are so highly specialized that it would serve little purpose to give them general publicity. Inventors may obtain lists from the Council.

Science News Letter, August 21, 1948

METEOROLOGY

Texas Hailstone Found Larger than Baseball

►A HAILSTONE larger than a regulation baseball has been added to the U. S. Weather Bureau's list of giant natural missiles from the sky.



GIANT HAILSTONE—The big chunk of ice shown here was compared for size with a baseball. It fell in connection with a tornado which cost three lives and injured 43 people last May in Texas.

Linlithgow Library

The big chunk of ice was found in Texas last May by a Pittsburgh, Pa., scientist. Dr. R. A. Glenn of the Coal Research Laboratory of the Carnegie Institute of Technology, Pittsburgh, was visiting his parents at a farm outside McKinney, Texas, May 3. The hail fell in connection with a tornado which cost three lives and injured 43 people. But Weather Bureau records of the storm indicate no damage from the hail. The biggest hailstone he found was photographed beside a baseball. The stone was

bigger. Dr. Glenn also reported that the hail had dented a corrugated sheet iron roof.

The picture is being added to the Weather Bureau's "rogues' gallery" of hailstones. But it is not the biggest one. The Texas stone was 11 inches in circumference, compared with one 17 inches around, which fell at Potter, Nebr., July 6, 1928. That one still rates as the largest ever recorded in the world.

Science News Letter, August 21 1948

Letters To The Editor

200-Inch Poem

On the completion of the 100-inch telescope on Mt. Wilson several years ago, Dr. Alfred Noyes was invited to be one of the first to inspect the new instrument. He wrote a wonderful poem on the occasion which is the introductory portion of his extensive poetic work on astronomy, *Watchers of the Sky*. I think it would be a splendid idea for the California Institute of Technology to interest Dr. Noyes at this time when the new 200-incher is getting itself ready for service.—Dr. Harold T. Mead, Head of Science Department, Rider College, Trenton 9, New Jersey. *Pasadena, please take notice.*

Hillside Farming

There are a few points I would like to raise with regards to your comments on farming on hillsides (SNL, July 10).

First of all, I agree with you that it would be more rational to try to find some high yielding food plants that could be grown on hillsides. But this is only part of the story. There is a lot hidden behind the innocent sounding words "clean cultivation." William Faulkner in his *Plowman's Folly* (University of Oklahoma Press) showed that clean cultivation was the culprit behind erosion, decreased farm productivity, and floods. The simple fact is that plants and decaying plant materials act as

a sponge to absorb water, and also act as a binding agent to hold soil particles together. In fact the very concept of soil becomes meaningless as such without the presence of decaying organic materials. Plants will not grow in crushed stone or sand alone. It is important to note at this point that soilless farming (hydroponics) is a basically different method of farming and data applicable to one method is definitely not applicable to the other.

Returning to our original line of thought, clean cultivation is the real "force of habit" culprit and a little investigation discloses that it originated at a time when the soil was so rich in organic material of all sizes that the farmer had to drag tree branches and other large materials out of the way of his plow. The result of clean cultivation is that the materials necessary for plant growth are not replaced in the soil. This leads to a gradual decrease in farm productivity as the materials in the soil are used up. As the United States was being settled and the West was being opened up, a man was not a real farmer unless he had "used up" two or three farms in his lifetime. There was plenty of rich virgin soil to the west, so why should he conserve the farm he had? Our country is settled and the total acreage is relatively fixed, yet "force of habit" farm methods are unchanged. . . —Fred I. Mocking, Chicago, Ill

Story of Grass

"The Blessed Meek" (SNL, Aug. 14) is an inspired piece of writing; its point is the very point of grass, which I am afraid many persons miss, and it pays honor to Mrs. Chase in a most heart-warming way. —Alfred Stefferud, Editor of the Yearbook, U. S. Department of Agriculture. *Thanks.*
Science News Letter, August 21, 1948

Cashew trees are important economically in the tropics where they grow; their decomposed leaves make good fertilizer, the wood is suitable for many uses, the sap yields a resinous gum and the bark contains a high percent of tannin.

The red color of *strawberries* is due to the presence of an anthocyanin pigment

SCIENCE NEWS LETTER

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GENERAL SCIENCE

Medical Books in Spanish

Basic texts for students and doctors in Latin America made possible by cooperation of Department of State with publishers in other American republics.

► MANKIND'S FIGHT for health is being advanced in the Western hemisphere by a program of book translation. It has resulted in the publication in Spanish and Portuguese of basic medical text and reference books by U. S. A. authorities, as well as books in other fields.

As part of this book translation project of the U. S. Department of State conducted by Science Service, nearly a score of major medical books have been translated and published in Latin America. Distributed by bookstores and publishers in the various countries, many of the medical books are now in use by physicians, public health workers, and medical students. Medical schools in the United States and physicians interested in Latin America are expected to add these books to their libraries.

Spread of Health Facts

The importance to health, industry, agriculture and national economy of a wide-spread distribution of medical and public health information is obvious. The great and continuing battle against disease in the Americas can be waged effectively only on a hemispheric scale. Illness and infection in any part of the western world is of concern to every other part. It is for these reasons that texts for medical schools have received major attention in the program. Very few medical books have been used in the medical schools of our neighbor countries. The good U. S. medical books that have been available in translation have in most instances been high priced, often double and triple the original-edition price. Students cannot or do not buy them. Most of the teaching has been by lectures only, supplemented by mimeographed lecture notes in some cases, and frequently by the use of out-of-date books of European origin that are not translated into Spanish or Portuguese.

In order to provide adequate texts for medical students there were carefully selected from an original list of 117 books a dozen or so of the most necessary texts, one book in each subject. Experts with experience in the medical schools and health programs of the other American republics, as well as officers of the leading medical, health and hospital organizations in the United States participated in this selection.

Through the cooperation of our government agencies and other interested organizations arrangements are made for a distribution which will introduce these basic medical texts in all areas as quickly as possible.

The spirit and purpose of these medical translations is given in the foreword of the Spanish translation, *MANUAL DE MEDICINA TROPICAL*:

"Mankind's continuing battle against disease is a concern of all the peoples of the world, no matter where they live, what language they speak or what flags earn their allegiance. . . .

"Fortunately for the peoples of the world, scientific knowledge, particularly medical and health information, traditionally is the rightful possession of all who need it. There is no more important freedom for a united world than the freedom of scientific research and information.

"This book brings into useful form the accumulated knowledge of an important field of medicine. As a part of their firm belief in the importance of international cooperation and interchange, the people of the United States through their government have participated in the mechanics of publishing in the Spanish language this important medical text and clinical volume."

Covers Many Fields

A wide field of information and subject matter is covered by the broad book translation project. Literature, political economy, history, sociology, psychology, education, mathematics, chemistry, physics, biology, agriculture, poetry, music, medicine, public health and fiction are some of the classifications in which the book translations can be catalogued. Because of the demand that exists in the other American republics for scientific, technical and medical information, major emphasis has been placed on books in these fields.

The following medical texts in Spanish are now available or in press:

Allergy

ELEMENTOS DE ALERGIA—Leo H. Crip—*Editorial P.R.O.C.M.O. Buenos Aires*, approx. 400 p., illus., \$5.00. Spanish translation of 1st edition of *ESSENTIALS OF ALLERGY*—Lippincott.

Biochemistry

TRATADO Y PRACTICAS DE BIOQUIMICA—Benjamin Harrow—*Editorial Atlante, Mexico*, 640 p., illus., \$6.20. Spanish translation of the 3d edition of *TEXTBOOK OF BIOCHEMISTRY* and 2d edition of *LABORATORY MANUAL OF BIOCHEMISTRY*—Saunders.

Child Psychology

LOS NIÑOS SON SERES HUMANOS—C. Anderson Aldrich and Mary M. Aldrich—*Libreria Medica Escalante, Mexico*, 192 p., illus., \$2.50.

Spanish translation of the 1st edition of *BABIES ARE HUMAN BEINGS*—Macmillan.

Diagnosis

MANUAL DE PROPEDEUTICA Y DIAGNOSTICO MEDICO—F. Dennete Adams—*Editorial Jus, Mexico*, 880 p., illus., \$6.00. Spanish translation of the 13th edition of *CABOT AND ADAMS PHYSICAL DIAGNOSIS*—Williams and Wilkins.

Ear, Nose and Throat

BRONCSCOPIA, ESOFAGOSCOPIA, GASTROSCOPIA—Chevalier Jackson and Chevalier L. Jackson—*Libreria de Porrua Hnos y Cia, Mexico*, 581 p., illus., \$11.50. Spanish translation of 3d edition of *BRONCHOSCOPY, ESOPHAGOSCOPY AND GASTROSCOPY*—Saunders.

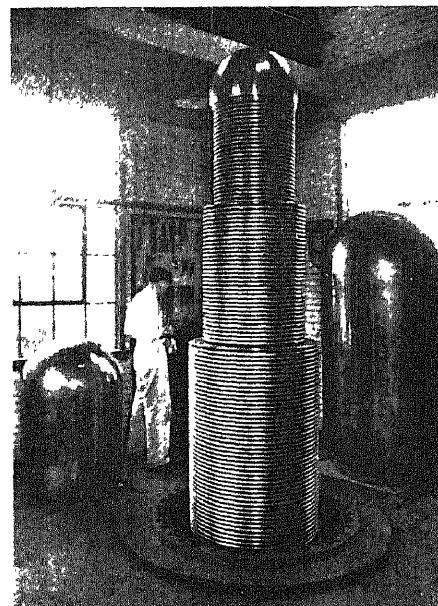
TRATADO DE OTORRINOLARINGOLOGIA—Chevalier Jackson and Chevalier L. Jackson—*U.T.E.A. Mexico*, approx. 840 p., illus., approx. \$11.00. Spanish translation of *DISEASES OF THE NOSE, THROAT AND EAR*—Saunders.

Endocrinology

TRATADO DE ENDOCRINOLOGIA—Robert B. Greenblatt—*Editorial P.R.O.C.M.O. Buenos Aires*, 340 p., illus., \$4.00. Spanish translation of 3d edition of *OFFICE ENDOCRINOLOGY*—Thomas.

Histology

BAILEY HISTOLOGIA—P. E. Smith and W. M. Copenhaver—*Lopez & Etchegoyen, Buenos Aires*.



ELECTROSTATIC GENERATOR
—This 3,000,000 electron-volt machine is used by Massachusetts Institute of Technology scientists to produce cathode rays and X-rays for studies on biological reactions to radiation. For production of X-rays a gold disk is inserted in the stream of electrons coming from the machine. If cathode rays are desired, the gold disk is removed and the stream of electrons is permitted to hit the substance being tested directly.

Aires, 908 p., illus., \$7.50. Spanish translation of the 11th edition of *BAILEY'S HISTOLOGY*—*Williams and Wilkins*.

Hygiene

MANUAL DE HIGIENE INDUSTRIAL—Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service—*Pan-American Sanitary Bureau, Washington*, 476 p., \$6.00. Spanish translation of 1st edition of *MANUAL OF INDUSTRIAL HYGIENE*—*Saunders*.

HIGIENE DEL INDIVIDUO Y DE LA COMUNIDAD—Clair E. Turner—*La Prensa Medica Mexicana, Mexico*, approx. 600 p., illus., \$4.50. Spanish translation of 7th edition of *PERSONAL AND COMMUNITY HEALTH*—*Mosby*.

Nursing

APRENDA A CUIDAR SU ENFERMO—Mary M. Peabody—*La Prensa Medica Mexicana, Mexico*, 64 p., paper, illus., 25 cents. Spanish translation of *HOME CARE OF THE SICK*—*New York State College of Home Economics, Cornell University*.

EJERCICIOS DE MATERIA MEDICA—M. Domitilla—*Editorial P.R.O.C.M.O., Buenos Aires*, approx. 160 p., approx. \$2.00. Spanish translation of 3d revised edition of *OUTLINE OF MATERIA MEDICA AND SPECIAL THERAPEUTICS*—*Saunders*.

TECNICA DE ENFERMERIA—Minnie Goodnow—*Editorial P.R.O.C.M.O., Buenos Aires*, approx. 450 p., illus., approx. \$4.00. Spanish translation of 4th edition of *TECHNIC OF NURSING*—*Saunders*.

Obstetrics

PRACTICA OBSTETRICA—Alfred C. Beck—*La Prensa Medica Mexicana, Mexico*, 864 p., illus., \$7.00. Spanish translation of 4th edition of *OBSTETRICAL PRACTICE*—*Williams and Wilkins*.

Pathology

MANUAL DE ANATOMIA PATOLOGICA—Robert Allan Moore—*La Prensa Medica Mexicana, Mexico*, 1339 p., illus., \$12.00. Spanish translation of the 1st edition of *TEXTBOOK OF PATHOLOGY*—*Saunders*.

MEDICINE

Fever From Food Allergy

➤ **BAFFLING FEVERS** which sometimes are thought to be caused by serious infections and at other times lead to operations on tonsils, sinuses and other organs, are in some instances nothing more than food allergy.

This is asserted by Dr. Albert H. Rowe, University of California Medical School allergist, in the *ANNALS OF ALLERGY*. Dr. Rowe published the first fever chart of a food allergy fever victim, a girl of 18 who was referred to him after four-and-a-half months hospitalization.

The physician, stating that the condition is only beginning to be understood well, said that long continuing fevers from food allergy have caused the unnecessary removal of appendices, gall bladders and pelvic organs. Such fevers have been diagnosed

Pharmacy

FARMACOPEA DE LOS ESTADOS UNIDOS DE AMERICA XIII—U.S. Pharmacopoeial Convention, Philadelphia, approx. 950 p., \$11.00. Spanish translation of 13th revision of the U.S. PHARMACOPOEIA—U.S. Pharmacopoeial Convention.

Psychiatry and Neurology

LAS BASES LA CLINICA NEUROLOGICA—Samuel Brock—*Editorial Rosario, Argentina*, 433 p., illus., \$8.75. Spanish translation of the 2d edition of *THE BASIS OF CLINICAL NEUROLOGY*—*Williams and Wilkins*.

NEUROANATOMIA HUMANA—Oliver S. Strong and Adolph Elwyn—*Editorial Rosario, Argentina*, 542 p., illus., \$10.00. Spanish translation of the 1st edition of *HUMAN NEUROANATOMY*—*Williams and Wilkins*.

PSICOCIRUGIA—Walter Freeman and James W. Watts—*Editorial Medico-Quirurgica, Buenos Aires*, 303 p., illus., \$7.50. Spanish translation of 1st edition of *PSYCHOSURGERY*—*Thomas*.

PSICOTERAPIA INFANTIL—Frederick H. Allen—*Editorial Rosario, Argentina*, 263 p., illus., \$2.00. Spanish translation of the first edition of *PSYCHOTHERAPY WITH CHILDREN*—*Norton*.

Surgery

PATOLOGIA QUIRURGICA—John Homans—*La Prensa Medica Mexicana, Mexico*, 1278 p., illus., \$10.00. Spanish translation of the 6th edition of *A TEXTBOOK OF SURGERY*—*Thomas*.

Tropical Medicine

MANUAL DE MEDICINA TROPICAL—Thomas T. Mackie, George W. Hunter and C. Brooke Worth—*La Prensa Medica Mexicana, Mexico*, 752 p., illus., \$6.00. Spanish translation of first edition of *MANUAL OF TROPICAL MEDICINE*—*Saunders*.

The books listed are on sale at leading bookstores in Latin America or may be ordered from the publishers. Science Service through its retail book department will supply any of these books at the prices stated, postpaid to any address in the Western hemisphere.

Science News Letter, August 21, 1948

went up eventually to 132 pounds. Five years later she was well and free of fatigue.

Dr. Rowe determined, by adding one food at a time to her strict diet, that the girl was suffering from allergy to milk, a common cause of gastro-intestinal allergy. In her weakened condition the girl had been fed large quantities of milk all her life in order to "build up her strength."

The physician said there is no definite explanation of the cause of allergic fever, but that it is possible a disturbance in temperature-regulating centers of the brain causes a localized or generalized allergic reaction. Food allergy should be considered, Dr. Rowe said, when physical examination and laboratory studies give no explanatory clues and no relief is given by treatment based on positive findings.

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AGRICULTURE-BIOLOGY

Program of Birth Control And Conservation Needed

➤ **MAN AS A HUMANITARIAN** does all he can to relieve the suffering of his fellow-man, raise his standard of living and prolong his life. Man as a natural being responds impulsively to powerful drives that result in ever-increasing numbers of the race, with resulting frantic endeavors to find subsistence and a need-driven destructive exploitation of the land.

The dilemma in which man the life-saver has placed man the breeder is powerfully set forth in "ROAD TO SURVIVAL," by William Vogt, chief of the conservation section of the Pan-American Union, published by William Sloan Associates.

The oft-portrayed tragedy that is overtaking the soil of this country is being repeated in intensified form in the less-favored lands of the world, where the density of the populations is matched only by the depth of their ignorance of even the slightest elements of conservation. Mr. Vogt points in particular to Middle and South America, where he is especially at home. The apparently easy way out, industrialization, he terms an *ignis fatuus*. The less favored lands not only lack technical knowledge to impart to the surplus populations which they are supposed to support through industrialization; they do not have the basic resources such as iron ore and coal, and they are busily ruining their hydroelectric installations even before they build them, by denuding their sloping lands of forest protection and farming them by primitive methods.

Mr. Vogt sees salvation for mankind in a dual program of restoring the productivity of the soil and diminishing the productivity of the population. In other words, he would team up conservation with birth control. If we do not do this, and do it soon, he declares, "like Gadarene swine, we shall rush down a war torn slope to a barbarian existence in the blackened rubble."

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MEDICINE

Aids to Cancer Detection

Two techniques which may simplify and make possible more accurate diagnosis of this disease while still in the early curable stage, have been reported.

► **TRANSPLANTING** human tissue to the eye of a guinea pig and extracting bone-marrow from human hip bones may help detect cancer while it can still be cured.

"Precancerous" growths, such as malignant warts or moles, are easily distinguished from those in the later spreading stage, the condition known as metastasis, by the guinea pig test, Dr. Harry S. N. Greene, of the Yale University School of Medicine, explained in the *AMERICAN MEDICAL ASSOCIATION JOURNAL* (Aug. 14).

He terms the procedure "simple" because cancer tissue survives transfer from one species to another. Non-cancerous tissue will not grow after it is transplanted.

If the cancer is far removed from the parent growth, as in metastasis, the way the transplanted tissue grows in the guinea pig's eye gives a clue to where it started in the body, Dr. Greene said.

"Hidden" cancer may be discovered by the new procedure of extracting bone mar-

row from the hip, Dr. Michael A. Rubinstein, of the Montefiore Hospital, New York, reported in the *A. M. A. JOURNAL* (Aug. 7).

The new procedure is easier, safer, and better suited for repeated use than the standard method of drawing marrow from the breast bone, a study of 216 patients indicated.

Cancerous cells were discovered that failed to show up when the standard procedure was used, Dr. Rubinstein said. He pointed out that it also was helpful in determining the spread of cancer to the bone.

Another advantage is that the bone marrow may give the first positive indication of cancer in a hidden location when X-ray films fail to do so.

Dr. Rubinstein said that this new technique can be used to diagnose leukemia, multiple myeloma, anemia, Hodgkins disease, cirrhosis of the liver, sprue and kidney diseases.

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ENGINEERING

Oil Drilling Easier

► **DRILLING CREWS**, boring more than 10,000 feet deep in oil fields, will have lighter work in the future. Automatic equipment, developed by the Humble Oil and Refining Company of Houston, Texas, is responsible. It makes the drilling job easier.

A derrickman, seated with only a control handle to operate, directs remote control power tongs to make up and break out drill pipe and bits. This is an important feature in Humble's Rig No. 30, a new-comer to the oil fields. Also it provides greater safety as well as reducing fatigue of the drilling crews.

The need for powered machinery to do work formerly done largely by human power became necessary with the deeper wells now being drilled which extend from 10,000 to 18,000 feet into the earth. More power is required for hoisting long strings of pipe and the weight of the drilling equipment.

Deep-hole experience taught oil operators that heavy powerful rigs were not the only requirement for deeper drilling. The higher costs involved demanded equipment vastly more efficient. Other devices have been developed to give this greater efficiency.

The bits used in drilling require more or less frequent replacement with resharp-ened tools. Pulling a bit and its stem, par-

ticularly when they extend nearly two miles below the surface, requires much time and labor. Harder formations found at depths reduce bit life rapidly. More frequent round trips to the surface must usually be made as the bit goes below 10,000 feet. The Humble rig lessens the time required for bit changing as well as easing the work of the drilling crew.

Most of the physical effort of making round trips for the bit and stem and drill pipe connections has been eliminated by the remote-control power tongs and what is called a pipe-racker. The derrickman and tong operator control this equipment from comfortable seats. Although the speed of pulling one stand with the new equipment is only a little greater than is possible with conventional hand operation, the speed can be carried on indefinitely without the slow-down that accompanies other methods due to workman fatigue.

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ASTRONOMY

Russian Document Gives Positions of Asteroids

► **COPIES** of a document, written wholly in Russian, giving the expected locations of over 1,500 objects whirling through

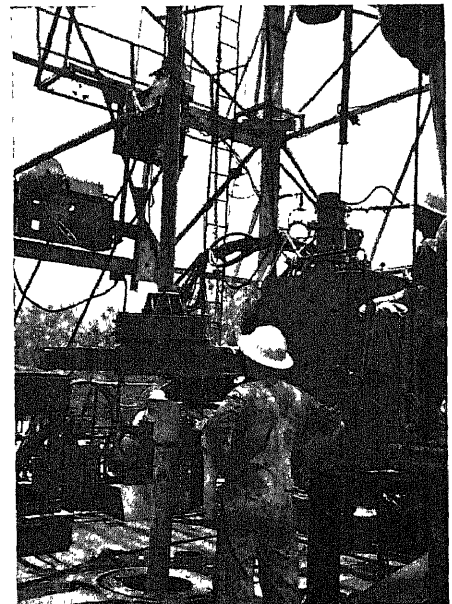
space, have arrived in America from Leningrad.

Far from being a military timetable, this is the latest astronomical publication of the U. S. S. R. Laborious computations by perhaps 40 Russian experts, from Kiev to Kasan, give the time and orbits when the known asteroids (little "earths" from 400 to 10 miles or less in diameter) will arrive opposite the sun and thus have a chance to be observed through telescopes.

Leningrad's Institute of Theoretical Astronomy, directed by Dr. M. T. Subbotin, took over from the Germans the international task of issuing this information to the world's observatories. The present tables, known to have been received at Harvard Observatory and the U. S. Naval Observatory, among American institutions, are written in Russian except figures and the names of the asteroids.

Soviet astronomers in issuing the new tables have immortalized Tito by giving his name to a hitherto unassigned asteroid, number 1550. And number 1554 has been christened Yugoslavia, both presumably before the recent political differences between Tito and the Kremlin. Almost every country has an asteroid named for it: 232 Russia, 916 America, etc. Famous men have their names attached to asteroids, as in the cases of 742 Edisona, 904 Rockefelleria, 932 Hooveria. And there is 993 for Dr. F. G. Moulton of the American Association for the Advancement of Science, and 1123 for Dr. Harlow Shapley of Harvard Observatory.

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POWER TONGS—Rotary helper watches with hands on hips as the remote-control power tongs, controlled by the operator, "hand" a stand of five-inch drill pipe to lower pipe-racking arm. The pipe weighs nearly a ton.

GENERAL SCIENCE

Europeans Adopt U. S. Tastes in Cigarettes

► THE AMERICAN SOLDIER who smoked his own favorite brand of cigarettes in Europe is responsible for a major change in European smoking tastes.

European smokers are shifting away from Oriental types of cigarette that they used to smoke and adopting American blends. This is reported by J. Bernard Gibbs of the U. S. Department of Agriculture's Office of Foreign Agricultural Relations who has recently returned from a study of tobacco marketing in Europe.

Since 1938 the amount of straight Oriental cigarettes consumed by Europeans has shrunk from 24% to 8% of the total. In the same time the consumption of cigarettes containing United States grown leaf has almost doubled, jumping from 29% to 52% of all those smoked, European manufacturers' reports reveal. In the Netherlands, Belgium, Denmark, Norway, Portugal, Sweden and Austria cigarettes blended in the American way make up 70% to 90% of total cigarettes smoked.

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GENERAL SCIENCE

Commodity Specifications Directory Has Supplement

► SOME 44,000 specifications of commodities produced or that can be bought in America are summarized either in a 1945 directory or its 1948 supplement just published by the National Bureau of Standards. The complete publication is for manufacturers, and particularly for purchasing agents who want to know just what they are getting.

A specification is a concise, definite, and complete statement of what the buyer requires from the seller. It includes limiting values for the properties necessary to meet the required service, with proper tolerances or variation from the exact standard. It serves as the common meeting ground for manufacturer, distributor, and user. It eliminates the haphazard method of wasteful searching and chance buying with incomplete information.

The federal government is the largest single purchaser of consumer goods in this country. Prior to 1921 each agency of the government had its own specifications for all materials it purchased. Then the Federal Specifications Board was established and given the duty of compiling and adopting standard specifications. The board is made up of representatives from the various branches of the government, with the director of the National Bureau of Standards ex officio chairman.

In compiling the National Directory of Commodity Specifications and its new supplement a strenuous effort was made to obtain current information concerning useful standards and specifications from all

national organizations that represent industry, and those interested in the formulation of commodity specifications.

The 1945 Directory, a revision of earlier publications, contains 1,311 pages. Its new supplement is a 322-page publication. Both may be obtained from the Superintendent of Documents, Government Printing Office, the first for \$4.00 and the supplement for \$2.25. They include some items that are not strictly commodity specifications but closely related information essential to most users.

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GENERAL SCIENCE

Doctors May Be Drafted If too Few Volunteer

► DOCTORS may be drafted if too few of them volunteer under the new Selective Service Act, the American Medical Association warned.

The Armed Forces may need as many as 6,000 more doctors to meet the needs of the draft, an editorial in the Association's JOURNAL (Aug. 7) estimated. There is no provision for a draft of doctors in the new law, but President Truman "may again insist on such a draft," the Association predicted, if volunteers do not meet the needs of the services.

The editorial stressed the obligation of young doctors who received training at government expense during the war to volunteer for service now.

These young doctors who saw no active service but received their education "owe an obligation to the government and to the people of the United States," the editorial declared.

Plans for better use of physicians in the services were hailed by the Association. These include studies to avoid leaving some doctors with too little to do, and air evacuation of wounded personnel in place of hospital ships.

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GENERAL SCIENCE

Latin Scientists to Study On Guggenheim Fellowships

► STUDIES ranging from atomic forces to horseflies will be made in this country by scientists from Latin American countries. Grants were announced by the John Simon Guggenheim Memorial Foundation. Money awarded by the Foundation to further the work of these scholars totals \$65,000.

Dr. Mauro Pereira Barretto of the University of Sao Paulo in Brazil will prepare a paper on the horseflies of tropical America. Dr. Jose Leite Lopes of the University of Brazil will work on the fundamental theory of nuclear forces. The other Latin American scientists include biologists, medical doctors, an electrical engineer, a mathematician and an astronomer.

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BIOCHEMISTRY

Microscopic Animals Are Used in Drug Testing

► LABORATORY MICE and guinea pigs have microscopic competitors in the business of testing drugs and poisons. These are rotifers, minute freshwater animals that rotate certain body appendages so rapidly as to create the illusion that they literally have wheels in their heads—whence the name.

Three workers at the Beecham Research Laboratories, R. H. Marriott, S. Morris and Y. Larthe, report in the British journal, NATURE (July 31) that they have been able to make effective and highly economical tests of a number of drugs, including aspirin, codeine, morphine and alcohol, using only a few drops of solution and 10 or 15 rotifers in a test-tube of water.

The tiny animals respond with four patterns of behavior: 1. dead from natural causes—which doesn't count; 2. killed by the drug; 3. narcotized; 4. alive and not narcotized.

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METALLURGY

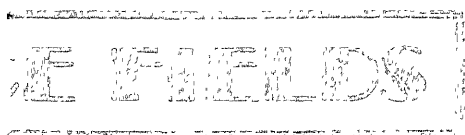
Radioactive Atoms Aid in Metallurgical Problems

► RADIOACTIVE ATOMS, famed in the field of atomic energy, are expected to assist solve mineral engineering problems and lead to more efficient production of metals from ores, it is revealed by the Massachusetts Institute of Technology. An expanded research program is now starting.

Some work has already been done, but the application of radioactive tracer techniques to mineral problems is to be considerably expanded, Dr. Thomas K. Sherwood, the institute's dean of engineering, stated. Modern radioactive tracer techniques provide engineers with an analytical tool hundreds of times more sensitive than the older chemical methods, he said. The program is to determine the best methods of application.

Studies by this method are made by following the electron emissions from radioactive atoms which are introduced into any substance being studied. For example, it is possible to "tag" copper sulfate with radioactive copper with the copper sulfate added to the mineral, sphalerite, in water. By means of a Geiger counter, an instrument widely used to detect and measure radioactivity, it is a simple matter to determine the amount of copper extracted from the solution. Many metallurgical problems of a similar nature but less simple will be studied by this method.

Science News Letter, August 21, 1948



PHARMACOLOGY

Identify Crude Drugs by Fluorescence Under Rays

► A SPEEDY and efficient method for identifying botanical drugs by their fluorescent glow under ultraviolet light has been developed by Charles R. Chase, Jr., of San Francisco while a student at the University of California College of Pharmacy.

This new system for identifying crude drugs won Mr. Chase the Kilmer Prize and a presentation of an inscribed gold key by the American Pharmaceutical Association.

Using the knowledge gained by earlier researchers who observed that some drugs give off a characteristic fluorescent glow when exposed to ultraviolet light, Mr. Chase tested 151 crude drugs but could get only about a third of them to fluoresce under the rays.

He next discovered that after treating a drug with one or more of three different solutions the drug would give off a characteristic glow of color that would easily identify it.

This may prove to be a very important advance, for traditional methods call for tedious studies of cell structure under the microscope or for time-consuming microchemical tests. Fast and reliable methods of detection are important to pharmaceutical firms, research workers and law enforcement officials, for such drugs reach the United States from all over the world.

Mr. Chase is continuing his experiments to perfect his system to include identification of drugs which show similar color changes or do not fluoresce at all after application of the three standard methods.

Science News Letter, August 21, 1948

GENERAL SCIENCE

Corner Druggist Seen Joining Ranks of D. P.'s

► YOUR neighborhood drugstore pharmacist may soon be a displaced person, predicts Dean J. Lester Hayman of the University of West Virginia College of Pharmacy, who spoke as president-elect before the American Association of Colleges of Pharmacy in San Francisco.

Dean Hayman pointed out that the independent drugstore pharmacist fills only a very limited number of prescriptions, while there is a growing demand for pharmaceutical service elsewhere.

He referred to the "increasing millions of our people under the coverage of prepayment or insurance plans for health coverage, many of which include or will include the providing of routine medication." In addition he listed the trend in

labor organizations for the inclusion of health benefits in their labor contracts; health services established in industrial concerns for employees and their families, and the government's program of medical care for veterans.

Presumably, pharmaceutical service would still be provided by pharmacists, but these trends, Dean Hayman predicts, may mean that "in the not too distant future a greater portion of the medication will be obtained through hospitals, clinics, dispensaries, or Veterans' Administration facilities."

The outgrowth of this, he fears, would "lead to unemployment and excessive economic competition," unless professional schools of pharmacy limited their enrollments. His proposal is to increase the period of pre-pharmacy education, to require a national admission test similar to those now required by medicine and dentistry, and to award graduates a distinctive professional doctorate degree.

Science News Letter, August 21, 1948

PSYCHOLOGY

Children's Eating Habits Influence Handedness

► IF YOU ARE RIGHT-HANDED, it may be because you learned to be when you put the first spoonful of cereal in your mouth.

Parents and teachers often influence children to be right-handed when they hand the youngsters objects such as a spoon, Dr. Gertrude Hildreth discovered in a study of 44 children at the Manhattanville Day Nursery in New York.

Dr. Hildreth watched the children as they ate and played. She found that while a child may eat a cookie with either hand, he is more likely to hold a spoon in his dominant hand.

"Children who get an early start in right-handed eating tend to become right-handed," Dr. Hildreth concluded.

In activities such as eating, where parents or teachers direct the child, he learns to use his right hand more, Dr. Hildreth explained in her report to the JOURNAL OF GENETIC PSYCHOLOGY (March). Where adults do not direct the child, he may use either hand.

Even though teachers at the nursery school tried to let the child use either hand, they tended to place silverware where the child could reach it best with the right hand.

When eating appeared to be an important factor in handedness, Dr. Hildreth decided to find out how much the youngsters used their hands in the process. One of the poorer eaters was counted at one meal to make 49 moves with his hands. He used his fork 10 times; spoon, 7; cup, 8; and fingers, 24.

The psychologist urged that more studies be made of the effects of training on handedness.

Science News Letter, August 21, 1948

CHEMISTRY

New Sunburn Compounds Give Greater Protection

► GOOD NEWS for sunburn victims comes with the announcement of two compounds that give five to eight times more protection against sunburn than any now in use.

The compounds are ethyl-p-diethylaminobenzoate and methyl-p-dimethylaminobenzoate. Their protective action against sunburn was reported to the American Pharmaceutical Association in San Francisco by Drs. W. D. Kumler and T. C. Daniels of the University of California College of Pharmacy.

These chemicals have proved less likely to change or deteriorate in the presence of sunlight, air and moisture than many now used. They can be applied in lotions, ointments or solutions, the scientists said. The compounds are not harmful or irritating to the skin and permit good tanning.

Laboratory experiments and observations of persons who have used these chemicals show they give more protection than other compounds when the sunlight is in the "sunburn" region of the light spectrum. Good tanning is possible because they do not absorb sunlight beyond the wavelengths where rays don't burn.

Science News Letter, August 21, 1948

CHEMISTRY

New Poison Makes Insects "Burn Themselves Out"

► RYANODINE, one of the newer insecticides, apparently kills by forcing its six-legged victims' body fires to burn under forced draft while it holds them in motionless paralysis. This is the indication of experiments carried out by Dr. Charles C. Hassett at the Army Chemical Center in Maryland.

Dr. Hassett injected minute measured amounts of the poison into the bodies of large cockroaches, which he then connected up with exceedingly delicate apparatus that measured the amounts of oxygen each insect took in. Although the insects became paralyzed from the moment of the injection, their oxygen intake rose steeply, to nearly two and one-fourth times normal.

The oxygen consumption remained high for a considerable period. By the end of 24 hours it had dropped back to normal, and later, between 30 and 40 hours, it had fallen to less than one-half normal. Dr. Hassett is of the opinion that this second drop signals the coming of death.

Ryanodine, unlike DDT and many other recently developed insecticides, is not a synthetic compound. It is extracted from a tropical plant known as *Ryania*, found in Mexico and Central America.

Dr. Hassett's experiments are reported in SCIENCE (Aug. 6).

Science News Letter, August 21, 1948

ASTRONOMY

Jupiter Brightest Object

It is 5.75 times as bright as the brightest star now visible, Vega. This giant planet will shine in the southwest during September evenings.

By JAMES STOKLEY

► EXCEPT for the moon, the brightest object to be seen in the evening skies during September is the giant planet Jupiter. This great orb, with its diameter of nearly 89,000 miles, as compared with the earth's 7,918 miles, shines in the southwest, in the constellation of Ophiuchus, the serpent-bearer. This is shown on the accompanying maps, which give the aspect of the skies at 11 p. m. daylight saving time, at the beginning of September and an hour earlier on the 15th. On the astronomical scale of brightness, its magnitude is minus 1.8. This is 5.75 times the brilliance of the brightest star now visible—Vega, in Lyra, the lyre, a little west of the zenith. The magnitude of Vega is plus 0.1.

Second brightest star of the September evenings is Capella, in Auriga, the charioteer, which is appearing in the northeast, just above the horizon. Because it is so low it does not show its full brilliance. This is also true of the third brightest star, Arcturus, in Bootes, the bear driver, which is now descending behind the horizon in the northwest.

Altair High in South

In a much better position is the fourth brightest star, Altair, in Aquila, the eagle. This is high in the south. With Vega, and Deneb, in Cygnus, the swan, directly overhead at the time of the maps, it forms an easily located triangle which makes a good guide in studying the constellations.

A sixth first-magnitude star is visible, but like Capella and Arcturus, its brightness is dimmed by its lowness. It is Fomalhaut, in Piscis Austrinus, the southern fish, shown low in the south. This is a star which is now nearly as high as it ever gets for observers in the United States. For countries in the southern hemisphere, however, it rises high overhead.

Although Jupiter is the only planet shown in the maps, some more are visible at other times during the night. Mercury will be farthest east of the sun on Sept. 25. Only about six degrees above the western horizon at sunset, it will be very difficult to locate. Mars, far away and quite faint, is in the constellation of Libra, the scales, and sets about an hour after the sun.

Venus is now a brilliant morning star, of magnitude minus 3.8, which makes it nearly 16 times as bright as Jupiter. In the constellation of Cancer, the crab, it rises several hours before the sun, and is some 40 degrees high at sunrise. Saturn, in Leo,

the lion, is close to the bright star Regulus, seen low in the east just before sunrise.

When the moon comes in front of the sun, we call it an eclipse, but it also may "eclipse" a star or planet. Then the phenomenon is termed an "occultation." While occultations of stars are common, it is much more rarely that a planet is occulted, but such an event happens in September. Unfortunately the planet Mars is not very bright, and is low in the sky at the time. However, with clear weather, and possibly with some optical aid such as binoculars, it should be possible to observe it, particularly for people in the eastern part of the country. Farther west the occultation occurs during the afternoon.

The moon at the time is about 3.5 days past new, so it will appear as a crescent. Moving through the sky from west to east, the dark edge will hide the planet. When the moon is thus nearly new, it shows the effect of "earth-shine," commonly called "the old moon in the new moon's arms." The whole moon can be seen faintly, its outline continuing the arc made by the crescent. The reason is that while the crescent consists of part of the lunar hemisphere on which the sun shines brightly, sunlight reflected from the earth shines on a section of the dark side, thus illuminating it for us. "Immersion" is the name given to the disappearance of the planet, while "emersion" is its reappearance, from the bright edge, the one toward the direction of the sun.

In the following table are given the times of immersion and emersion of Mars on Sept. 6, for Washington and four other locations in various parts of the United States, as computed at the U. S. Naval

Observatory. These are: 1. western Massachusetts, about 15 miles north northeast of Northampton; 2. western Illinois, about 25 miles east of Quincy; 3. Texas, about 25 miles southwest of Austin; 4. southern California, about 30 miles south of Fresno.

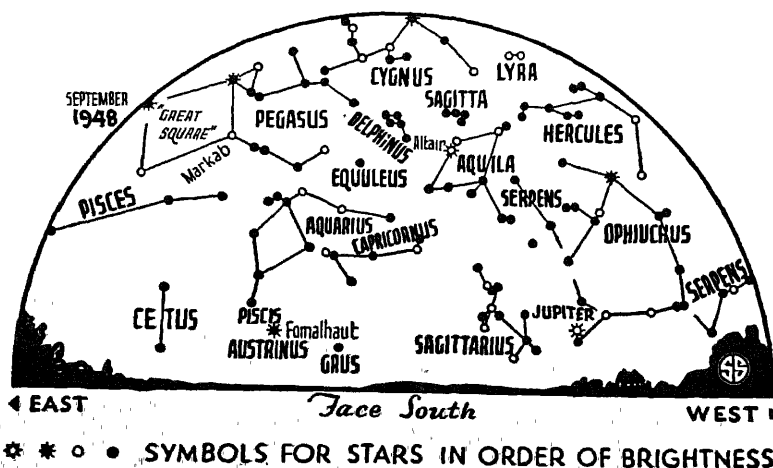
Location	Kind of time	Immersion	Emersion
Washington	EDST	6:07 p.m.	6:57 p.m.
1.	EDST	6:17 p.m.	6:49 p.m.
2.	CDST	4:31 p.m.	5:42 p.m.
3.	CDST	4:24 p.m.	5:51 p.m.
4.	PDST	1:52 p.m.	2:59 p.m.

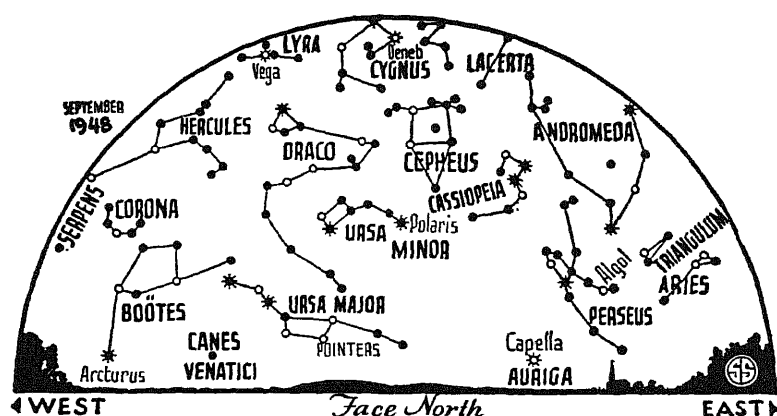
Even if you cannot see the actual occultation in either of its phases, look for the moon on the evening of Sept. 6 as soon as it gets dark, and you should have little difficulty seeing the planet close to it.

"Harvest Moon"

The full moon which occurs on Sept. 18 at 5:43 p.m., EDST, is known as the "harvest moon." The peculiar thing about it is the slight difference between moonrise on successive nights. Thus, at 40 degrees north latitude and on the central meridian of the time belt (i. e. 75th meridian for Eastern time, 90th for Central, 105th for Mountain and 120th for Pacific), the moon rises on the 17th at 6:03, standard time; on the 18th at 6:24 and the 19th at 6:44, only about 20 minutes difference daily. In contrast, six months ago, for the same locations, the nightly delay at the time of full moon was an hour and a quarter. Since the September full moon comes up at nearly the same time for several nights in a row, it supposedly gives the farmers light to do their harvesting in the evening; hence the name.

Reason for the harvest moon is found in the angle made with the horizon by the ecliptic—the path along which the sun, moon and planets seem to move, which is really the projection in the sky of the plane of the orbit of the earth. Each day, at all times of year, the moon advances about the





same distance—about 12 degrees—along this line. In March it happens that when the full moon is rising the ecliptic makes a very steep angle. Thus, the moon's daily motion takes it well below the horizon from one day to the next and thus causes the maximum difference in moonrise.

In September, on the contrary, the ecliptic makes a low angle with the horizon, and the moon's daily motion does not take it much farther below. It does shift it toward the south, and causes a considerable difference in the point of the horizon where the moon rises, but there is a minimum delay in the time of rising. In October, conditions are nearly the same, and again there is little daily difference. This is called the hunter's moon.

Time Table for September

Sept.	EDST	
2	9:04 a. m.	Moon passes Saturn
	12:00 p. m.	Venus farthest west of sun
3	2:00 a. m.	Moon nearest, distance 222,000 miles
6	7:21 a. m.	New moon
	5:51 p. m.	Moon passes Mars and occults it
10	3:05 a. m.	Moon in first quarter
	8:34 a. m.	Moon passes Jupiter
16	7:00 a. m.	Moon farthest, distance 252,400 miles
18	5:53 a. m.	Full moon
22	11:22 p. m.	Sun crosses equator, autumn commences in northern hemisphere
25	6:00 a. m.	Mercury farthest east of sun
	EST	
26	12:07 a. m.	Moon in last quarter
29	8:04 a. m.	Moon passes Mercury
	11:35 p. m.	Moon passes Saturn

Subtract one hour for CT, two hours for MT, and three for PT.

Science News Letter, August 21, 1948

ELECTRONICS

Machine Plays Chess

➤ A MACHINE now can solve business problems, write your letters or play you—and beat you—in games of gin rummy or chess.

The "thinking machine" costs approximately \$175,000, not counting what you will lose if you play gin rummy against it.

UNIVAC, the universal automatic computer, was described at a symposium on modern calculating machinery held at the University of California at Los Angeles by Dr. John W. Mauchly, who together with J. P. Eckert of the Eckert-Mauchly Computer Corporation, Philadelphia, designed the machine.

Feed the machine a form letter along with instructions on how to write it and personalized letters, no two alike, will roll out of UNIVAC in an endless paper parade.

It plays chess and gin rummy so perfectly that no human opponent has a chance against it.

In a more serious mood it can work on statistical analysis, business problems, classification of weather observations and complex aeronautical problems. It can solve tricky problems of traffic control over airports.

In speed, flexibility and versatility it surpasses earlier calculating machines, declared the scientists.

The earlier ENIAC was pretty smart but the UNIVAC is even smarter. The ENIAC, which was also designed by Dr. Mauchly and Mr. Eckert, could store in its internal memory 20 numbers of 10 digits each and could multiply these numbers 300 times a second. UNIVAC can store 1,000 numbers of 12 digits each in its vastly improved memory and can multiply them 500 times a second.

It is the first machine which can take instructions along with the numbers fed to it and can even change its own instructions. Coded instructions are fed into the machine on slim reels of magnetized tape.

This "thinking machine" is smaller than any of its predecessors. It measures only three by eight by six feet while ENIAC has 40-foot panels eight feet high. This new compactness is made possible by more efficient design which requires only 1,500 vacuum tubes as against nearly 20,000 for ENIAC.

UNIVAC is scheduled for delivery within the next 18 months.

Science News Letter, August 21, 1948

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8-21

Do You Know?

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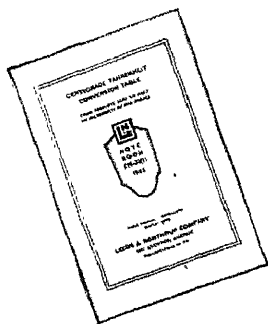
The *ostrich*, which weighs from 150 to 300 pounds, is small in comparison with the extinct giant moa from New Zealand, which weighed about 500 pounds, and the elephant bird from Madagascar, also extinct, which weighed up to 1,000 pounds.

Plants are the only living things that can use directly the sun's energy and combine it with raw materials from the earth.

Although more than 100 kinds of *birds* have become extinct during the past two centuries, none have become extinct in Africa and only one or two in Asia, South America and Australia.

Tar sands, found in both the United States and Canada, are common sands stuck together by a black tarry material from which crude oil may be obtained by washing with hot water or by direct distillation.

Soaring *hawks* circle over the edges of forests or over cliffs where there are up-currents of air to help their gliding.



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GEOPHYSICS

Ocean Bottom Mapped

Loran in conjunction with the newest developments in echo sounding is aiding scientists chart ocean currents and map mountains and valleys of the ocean floor.

► MORE ACCURATE charting of location and velocity of ocean currents far out of sight of land, and increasingly detailed mapping of the mountains and valleys on the ocean bottom are among the accomplishments of seagoing physicists who have been recruited to the aid of oceanographers, states Prof. Columbus O'D. Iselin, director of the Woods Hole Oceanographic Institution, in *PHYSICS TODAY* (August).

Principal scientific tools employed in this work are Loran, war-born method that enables a ship to plot her position by picking up pulsed radio signals from accurately sited sending stations on shore, together with the newest developments in echo sounding.

Loran is particularly good in giving an accurate picture of changes of position of a vessel as she drifts or sails. By dodging into and out of a current, keeping constant track of position changes, it is possible to get data on its velocity on a hitherto impossible order of accuracy. Similarly, while the echo sounding apparatus is recording depths of submarine valleys and heights of mountains, Loran measures their lengths

and breadths with reasonable accuracy.

Thus far, the use of Loran has shown that the Gulf Stream is considerably narrower and swifter than had been supposed. Larger meanders in the current have been found in the sector off New England and powerful eddies have been observed to form on either side. Data of this kind are exceedingly useful in everyday navigation.

Another discovery made by the seagoing physicists is the existence of a "false bottom" over much of the floor of the ocean. Small depth charges set to explode on reaching bottom send up a direct sound-wave signal, which is followed after a considerable interval by an echo. This indicates that over the solid rocky ocean floor there is a great depth of soft, unconsolidated sediment.

Dr. Iselin states that it was difficult at first to find physicists with stomachs reasonably resistant to seasickness. However, a group of young men have been recruited who have long since acquired their sea-legs and are able to man their instruments in all weathers.

Science News Letter, August 21, 1948

BOTANY

Puzzle Over Metasequoia

► CHINA'S "dawn redwood," *Metasequoia*, may turn out to be not only a "living fossil" but a "surviving ancestor" of the well-known American coast redwood, *Sequoia sempervirens*. This possibility has developed from an effort by Dr. G. L. Stebbins, Jr., of the University of California to settle the rather puzzling relationships of the recently discovered Chinese tree, hitherto known only as a fossil species (*Science*, July 30).

In characters visible to the naked eye, the dawn redwood resembles the coast redwood more than it does any one of a half-dozen other related conifer species, among which are the California big tree and the bald cypress of the South. However, it has points of difference with the coast redwood, and similarities to some of the other trees.

The study developed the interesting suggestion that the coast redwood, unlike all its kin-trees, may be a hybrid. This idea comes from an examination of the heredity-bearing chromosomes in the cell nuclei. The coast redwood appears to have a basic count of 66 chromosomes, as compared with 22 in most of the other related

species. Multiple chromosome numbers always suggest hybrid origin to plant scientists.

Science News Letter, August 21, 1948

PHARMACOLOGY

\$1,000 Prize Awarded For Iodine Research

► THE FIRST Iodine Educational Bureau award of \$1,000 will go to Dr. W. T. Salter, professor of pharmacology at Yale University School of Medicine. His selection was announced at the convention of the American Pharmaceutical Association in San Francisco. He will receive the award at the next annual meeting.

The Yale pharmacologist was cited for his exploration of many fundamental questions concerning the function of iodine in nutrition and the life processes of the body. Dr. Salter's research was on the function of the thyroid gland and its relation to blood iodine fractions. He did significant work with radioactive iodine, particularly its effect on the thyroid gland in cases of toxic goiter.

Science News Letter, August 21, 1948

MEDICINE

Gift Restores Cancer Lab

Science Service story inspired \$50,000 gift from the Ladies Auxiliary, V.F.W., for the new summer students' laboratory buildings of the Jackson laboratory.

► **CANCER** fighting all over the world will move forward at a faster pace, thanks to an event celebrated at Bar Harbor, Me., on Aug. 7.

The event was the dedication of the new summer students' laboratory buildings of the Roscoe B. Jackson Memorial Laboratory. The buildings, consisting of a laboratory where 40 students can work and learn, and dining, recreation and residence halls, have been built with a \$50,000 gift from the Ladies Auxiliary, Veterans of Foreign Wars.

Inspiration for the gift was a Science Service story in a Florida newspaper, the ST. PETERSBURG TIMES. That story reported that medical authorities expected the search for a cancer cure to be slowed for years because forest fires last fall had destroyed the Jackson Laboratory at Bar Harbor and its invaluable collection of mice specially bred for cancer research.

When Mrs. Anna Mae Shaw of St. Petersburg, a past commander of the Ladies Auxiliary, Veterans of Foreign Wars, read that Science Service story, she immediately clipped it from her newspaper and sent it to Mrs. Evelyn B. Monaco of Gallup, N. Mex. Mrs. Monaco is chairman of the organization's cancer research fellowship fund. Mrs. Monaco immediately got in touch with Dr. C. C. Little, director of the Jackson Memorial Laboratory, and the planning that followed resulted in the buildings dedicated at Bar Harbor.

The significance of these buildings lies in the fact that they make it possible for the Jackson Memorial Laboratory to carry on with its new idea in cancer fighting. This is the training of talented young men and women to become assistants to cancer researchers.

The great dearth of such trained assistants, even before the fire last fall, brought requests from cancer-fighting institutions everywhere for the Jackson Laboratory to train workers for them. The more trained assistants the research workers have, the faster they can get on with their search for better ways to stop cancer. The long-sought cure for cancer might even come from one of the young students training there now.

The need for trained assistants is so great that Dr. Little and the trustees of Jackson Memorial Laboratory considered replacement of the summer students' Laboratory buildings an emergency that had to be met and gave it first place in their reconstruction plans. The new buildings dedicated are the first unit in the reconstruction of the fire-destroyed institution.

Present for the dedication besides Mrs. Monaco were Mrs. Dorothy Mann of St. Louis, national president of the Ladies Auxiliary, Veterans of Foreign Wars, Mrs. Helen M. Murphy of Union, N. J., senior vice president of the organization, and Mayor James F. Reynolds of Everett, Mass., representing the national commander of the Veterans of Foreign Wars. It was Mrs. Mann's idea, proposed at the last encampment of the Ladies Auxiliary, that the organization should aid cancer research.

Science News Letter, August 21, 1948

ASTRONOMY

Many Comets Whirl Around Terrifically Hot Star

► **THOUSANDS OF BILLIONS** of miles away from us is a star, tremendously hot, surrounded by a vast number of huge whirling comets. It is a so-called planetary nebula, Dr. Donald H. Menzel, Harvard astronomer, told the International Astronomical Union which met in Zurich.

This is a new picture of an astronomical object that has long puzzled astronomers. The filaments that comprise the luminous mass surrounding the central star are pictured as possessing a sharp condensed head and long streamers that extend to enormous distances.

Such nebular shells are probably much less massive than previously estimated, Dr. Menzel's calculations indicate.

Only about 100 to 150 such stars with concentric shells of luminosity are known to exist in space. These planetary nebulae are easily recognized by their gaseous spectra.

In the past, the nebula surrounding the star was believed to be as massive as the star that forms the central nucleus of the planetary nebula. The new estimate reduces its total mass by a factor of at least 100, and makes more reasonable the idea that planetary nebulae are stars that exploded thousands of years ago.

The central stars are known to be extremely hot, with temperatures ranging from about 30,000 to 150,000 degrees Centigrade. Most of their radiation is in the far ultraviolet.

Dr. Menzel reported to the meeting an as yet unpublished observation by Dr. Walter Baade of Mount Wilson Observatory, who found the nebular matter in the helical nebula in Aquarius to be distributed in knots and filaments. This particular planetary nebula is the largest of them all

when seen through a telescope. Probably not more than one percent of its nebular volume is filled with matter.

Dr. Baade's observation, which fits in well with Dr. Menzel's theory, indicates that the present estimate of the abundance of hydrogen relative to oxygen is much too high. Hydrogen still proves to be very abundant, however, accounting for more than 99% of all atoms in the nebula.

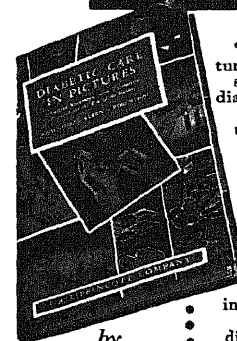
Science News Letter, August 21, 1948

Science Service Radio

► **LISTEN** in to a discussion on advances in chemistry on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDT Saturday, Aug. 28. Watson Davis, director of Science Service, will have as his guest Dr. B. D. Van Evera, general chairman of the local committee of the American Chemical Society in Washington. Dr. Van Evera will give advance information on discoveries to be reported at a national meeting of the American Chemical Society the following week, and will tell of new research in progress in government laboratories.

Science News Letter, August 21, 1948

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"Diabetic Care in Pictures" was designed to smooth the way so that diabetes and its treatment might be completely understood. The result of more than 25 years of questioning in a nationally-known clinic—and the tested answer to all those questions. Simply written and lavishly illustrated by charts, photographs and drawings, it tells about the diet, measurement and injection of insulin, insulin reactions, acidosis and diabetic coma, blood and urine tests and necessary body care. The coupon below will bring a copy immediately.

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MEDICINE

Chemicals Aid Cancer

➤ TWO CHEMICALS derived from the vitamin, folic acid, are proving effective in fighting cancer and leukemia, the American Pharmaceutical Association was told at its meeting in San Francisco.

Cancer patients have less pain and reduced need for narcotics when treated with pteroyltriglutamic acid, James H. Boothe of the American Cyanamid Company reported.

He said that some cases have been reported in which tumors were arrested by treatment with the chemical. But, he emphasized, further study will be needed to

determine its effectiveness as more than a pain-killer.

Another member of the folic acid family has aided several children suffering with leukemia, Coy Waller, also of the American Cyanamid Company, told the meeting.

The chemical, aminopterin, was used to treat leukemia at Children's Hospital in Boston after it had been successfully tested against the disease in animals.

This chemical checks the overproduction of leukemic cells, but it is difficult to use clinically because of undesirable reactions from the toxic compounds.

Science News Letter, August 21, 1948

ARCHAEOLOGY

Iron Age Men's Fashions

➤ MEN'S FASHIONS in Denmark 1,900 years ago did not run to two-pants suits. They called for two coats—and no pants at all.

Such is the indication of two bundled-up garments found with the nude corpse of a man, well preserved in the acid water of a Danish peat bog some time ago. At first taken for blankets, they proved upon careful unwrapping and cleaning to be two skin jackets.

The better one of the two was made from 22 skins of some short-haired animal, so skillfully sewed with fine skin thread that any present-day furrier might be proud to claim it as his handiwork.

It is about 35 inches long in front but shorter in the back, with a 21-inch neckband. One side has two buttonholes, and the opposite edge is equipped with two leather straps sewed around a pair of small wooden plugs. One of these was found crosswise in its buttonhole.

The second garment is in much poorer condition. It is about the same size as the other, but of "pullover" pattern. The material is sheepskin.

By a series of pollen tests, Dr. Alfred Andersen, leading Danish geologist, fixed

the date of the find as of the Iron Age, about the beginning of the Christian era.

An ancient carving in the castle built by the Romans at Mainz, Germany, furnishes corroboration of this two-coats, no-pants fashion of that date. It shows chained Teutonic war prisoners wearing nothing but these short jackets.

Science News Letter, August 21, 1948

ARCHAEOLOGY

Indian Bison Slaughter Site Is Discovered

➤ AN ENORMOUS PILE of bison bones discovered near Heart Butte, N. D., by an archaeological survey party from the Smithsonian Institution in Washington, may be the result of an old Indian method of slaughtering these animals. Archaeologists believe that the Indians, who lived in a rock shelter found near the bone deposit, killed the bison by simply driving a whole herd over a cliff, thus accomplishing in a short time the result of several days' hunting by other methods.

The bison bones and the Indian dwelling site were found by one of the survey parties which are combing the area in an effort to locate evidences of prehistoric Indian activities before they are flooded by dams and reservoirs now under construction. Areas in the states of Nebraska, North and South Dakota, Wyoming, Texas, Oklahoma, Colorado, Washington and Oregon are being covered by the search.

The archaeological rescue work this summer is a cooperative project of the Smithsonian Institution, the National Park Service, the Bureau of Reclamation and the Army Corps of Engineers. Some excavation work is already in progress.

At Medicine Creek, Nebr., an old Indian earth-lodge village has been found which dates back to the days before Columbus.

Further excavations are now going on there to discover more about the lives of these early people.

Work in the entire Missouri Basin area is under the direction of Dr. Waldo R. Wedel, while Dr. Philip Drucker has general supervision over the surveys in the Columbia river region in Washington and Oregon. The program as a whole is under the direction of Dr. Frank H. H. Roberts, Jr., associate director of the Smithsonian's Bureau of American Ethnology.

Science News Letter, August 21, 1948

PHARMACOLOGY

Study on Eye Solutions Gains Pharmacist Award

➤ FOR DEVELOPING more satisfactory drug solutions for use in the eye, Harry W. Hind, practicing pharmacist of San Francisco, was awarded the 1948 Ebert Prize by the American Pharmaceutical Association.

Mr. Hind undertook research that aids the pharmacist in preparing drug solutions for use in the eyes. These preparations prove stable over a period of time and non-irritating to the delicate eye tissues. At the same time they have the exact drug action desired by the physician.

The most important drugs used in the eye were classified into five groups. Five "buffer systems" were then recommended for use by pharmacists in compounding prescriptions for these drugs.

Prof. Frank M. Goyan of the University of California College of Pharmacy received honorable mention for his part in the research.

Science News Letter, August 21, 1948

CHEMISTRY

Virus Molecules Line Up To Form a Crystal

See Front Cover

➤ ROW ON ROW, like soldiers on parade, the molecules line up in orderly fashion to form a crystal of tobacco necrosis virus protein. Each little dot is a virus unit, or molecule. Those that are out of order represent virus protein that is not completely crystallized. The photograph, shown on the cover of this week's SCIENCE NEWS LETTER, taken with the electron microscope using the metal shadowing technic, is among the first photographs ever taken showing molecules. It was taken by Dr. R. W. G. Wyckoff, of the U. S. National Institutes of Health, and shown at the International Congress of Crystallography at Harvard University. Each molecule is a sphere about four ten-thousandths of an inch in diameter. The crystal of the molecules should not be confused with the rod-shaped crystals of tobacco mosaic virus protein, another disease of plants.

Science News Letter, August 21, 1948

HOUSES OF EARTH

The ground you stand on is your best building material. Easy to build—insulated against heat and cold. Ratproof—Soundproof—Termiteproof and Fireproof. Book based largely on findings of the Bureau of Plant Industry, Soils and Agricultural Engineering. Low Building and Upkeep costs.

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Books of the Week

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ALKYLATION OF ALKANES, VOLUME I: PATENTS ON ALKYLATION OF ALKANES—Gustav Egloff and George Hulla—*Reinhold*, 1138 p., \$20.00. The principles involved have broad implications that can be applied to amines, alcohols, aromatic hydrocarbons, and many other organic compounds.

CATHODE RAY TUBE DISPLAYS—Theodore Soller, Merle A. Starr, and George E. Valley, Jr.—*McGraw-Hill*, 746 p., illus., \$10.00. In three and a half years after January, 1942, nearly 3,000,000 tubes were made. This book is intended to aid in their peacetime use.

CHECKLIST OF PLANTS OF GRAND CANYON NATIONAL PARK—W. B. McDougall—*Grand Canyon Natural History Assn.*, 3d ed., 126 p., illus., paper, 50 cents. Including 40 species not known to occur in Arizona outside the park and seven not known from any other part of the world.

CHICAGO NATURAL HISTORY MUSEUM, REPORT OF THE DIRECTOR TO THE BOARD OF TRUSTEES FOR THE YEAR 1947—*Chicago Natural History Museum*, 144 p., illus., paper, \$1.00. Includes reports of research and a list of members.

ESKIMO DOCTOR—Aage Gilberg—*Norton*, 229 p., illus., \$3.00. The story, in diary form, of a Danish physician whose practice was among the Eskimos of Thule, Greenland. Illustrated by the author's own photographs and translated by Karin Elliott.

ESSENTIALS OF PHYSICS—Carl F. Eyring—*Prentice-Hall*, 422 p., illus., \$5.00. An elementary college text especially for non-science students. Formerly entitled, "Survey Course in Physics."

FOURTH SEMI-ANNUAL REPORT—United States Atomic Energy Commission—*Govt. Printing Office*, 192 p., paper, 35 cents. Including the production, distribution, and utilization of isotopes, atomic power, and sources of the raw material, uranium. (See *SNL*, Aug. 7 and 14.)

HANDBOOK OF SOUTH AMERICAN INDIANS, VOLUME 4, THE CIRCUM-CARIBBEAN TRIBES—Julian H. Steward, Ed.—*Govt. Printing Office*, 609 p., illus., \$3.50. About tribes that are the least known of all those covered in the handbook; the great majority have long been extinct culturally, if not racially.

THE INDUSTRIAL ENVIRONMENT AND ITS CONTROL—J. M. Dallavalle—*Pitman*, 225 p., \$4.50. For those concerned with conditions affecting the health and welfare of workers.

THE LEAFHOPPERS, OR CICADELLIDAE, OF ILLINOIS (EURYMELINAE-BALCLUTHINAE)—D. M. Delong—*State of Illinois Department of Registration and Education*, 376 p., illus., \$1.50.

MARINES AT MIDWAY—Lt. Col. Robert D. Heinl, Jr.—*Govt. Printing Office*, 56 p., illus., paper, 50 cents. An official account of an epic in Marine Corps history.

MATHEMATICS, OUR GREAT HERITAGE: Essays on the Nature and Cultural Significance of Mathematics—William L. Schaaf, Ed.—*Harper*, 291 p., \$3.50. Not a mathematical work, but a book about mathematics in-

tended to remedy the situation that although "mathematical physics embodies the highest intellectual achievements of man, most of it, unfortunately, is inaccessible to the cultured layman."

OUR SURROUNDINGS: A Complete General Science—George W. Fowler, Morton C. Collier and Ernest L. Thurston—*Iroquois Publishing Company*, rev. ed., 757 p., illus., \$2.96. Includes atomic energy, television, DDT. A high school text.

PRINCIPLES AND PRACTICE OF THE RORSCHACH PERSONALITY TEST—W. Muns—*Lippincott*, 164 p., \$4.00. The author, who is British, brings together into one convenient handbook information from many sources on the use and interpretation of this important personality test.

THE PRONGHORN ANTELOPE AND ITS MANAGEMENT—Arthur S. Einarsen—*Wildlife Management Institute*, 238 p., illus., \$4.00. Information about a beautiful animal that can travel 50 to 60 miles an hour; an animal that has recently been salvaged from extinction.

SCIENCE, SERVANT OF MAN: A Layman's Primer for the Age of Science—I. Bernard Cohen—*Little, Brown*, 362 p., illus., \$4.00. Written at the request of the National Science Fund of the National Academy of Sciences to answer the questions: "What is the good of it? How are discoveries made? What spirit moves the scientist?" Interesting facts and background in a wide variety of fields.

STRENGTH OF HOUSES: Application of Engineering Principles to Structural Design—Herbert L. Whittemore and others—*Govt. Printing Office*, 135 p., illus., \$1.50. Data which will enable the engineer to avoid the use of superfluous material as well as to make houses more beautiful by making windows larger and bringing more of the outdoors inside. (See *SNL*, June 26.)

STUDIES OF UPPER-AIR CONDITIONS IN LOW LATITUDES—Herbert Riehl—*University of Chicago Press*, 103 p., illus., paper, \$2.00. In two parts, one on the formation of West Atlantic hurricanes and the other on relations between high- and low-latitude circulations.

SURVEY OF FOOD AND NUTRITION RESEARCH IN THE UNITED STATES, 1947—*National Research Council*, 306 p., paper, \$1.00. A compilation of active research projects classified by subject, list of organizations conducting research, personnel list, and index.

A TEXTBOOK OF HEAT: For Upperclassmen—LeRoy D. Weld—*Macmillan*, 436 p., illus., \$5.00. For students already familiar with differential and integral calculus.

Science News Letter, August 21, 1948

ARCHAEOLOGY

Ruins of Danish Castle Produce Immense Key

► EXCAVATION of a knight's castle near Gylling, Denmark, which was besieged and gutted with fire more than 600 years ago

brought to light an immense key to the main gate, a hammer of unique design, and a pair of well-preserved iron handcuffs.

A number of broken bronze dishes and pans have been revealed, as well as many silver coins. The place is literally covered with heavy crossbow bolts.

The excavation is expected to furnish much new information about life behind the fortified walls of a knight's castle in the late Middle Ages.

The site is known as Kjaersgaard Volsted. It was originally surrounded on three sides by a lake, while a moat protected it against attack from land.

The owner of Kjaersgaard was a fourteenth century German knight who gained control of the castle through marriage. He refused to help the Danes with their war of liberation and gave refuge to defeated Germans.

The great numbers of missiles now being recovered give an idea of the length of time he withstood attack before his fortification came down in flames. Perhaps the war or maybe the Black Death prevented the ruins from being stripped of much precious metal before it became a forgotten, overgrown heap in the lake.

Science News Letter, August 21, 1948

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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 428. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **AUTOMOBILE DOOR LOCK**, which can not be opened by children while the car is moving or the engine running, makes use of a vacuum tube from the engine which pulls spring-retracted strikers into locked position on the doors when the engine is started. Pressure on a button on the instrument board breaks the vacuum when desired.

Science News Letter, August 21, 1948

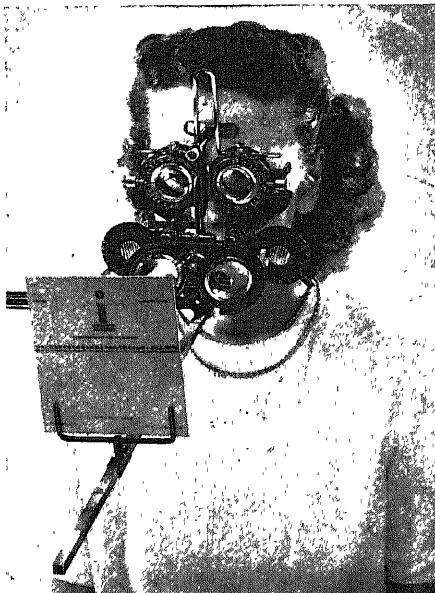
⚙️ **BIT-WEIGHT CONTROL** is an electrical above-ground device which automatically controls the downward pressure on an oil-drilling bit, working up to 18,000 feet down in the earth, caused by the weight of the bit's shaft. It adjusts the position of the hoisting mechanism to maintain a constant restraining force on the drill stem.

Science News Letter, August 21, 1948

⚙️ **ALUMINIZED STEEL** of a new type is particularly for anodes and other fabricated parts for vacuum tube use. The material eliminates the need for carbonized nickel-plated steel parts, and, it is claimed, provides better welding properties, lower cost and eliminates possible transfer of carbon to cathode during manufacture.

Science News Letter, August 21, 1948

⚙️ **EYE-TESTING** and training instru-



ment, shown in the picture, is a complete and versatile device for use by professionals in determining visual deficiencies and the proper prescriptions for corrective glasses. It also discovers inability of the two eyes to function as a unit and assists correction by eye muscle training.

Science News Letter, August 21, 1948

⚙️ **DRYING TIME** recorder, for testing paints, varnishes, enamels, adhesives and other coatings, is placed over a wet film applied to a glass panel and has a spherical pin that travels in a circle in contact with the film. Rotating at the rate of one revolution per day, recording mechanism shows when the pin no longer leaves an impression on the film.

Science News Letter, August 21, 1948

⚙️ **DRIER FOR** photographic prints, photostats and blueprints, with electrically driven variable-speed drum and a balanced heater unit within the drum, is an improved type suitable for small shop or home use. Operating on 120-volt current, either alternating or direct, it is plugged into an electric outlet without special wiring.

Science News Letter, August 21, 1948

⚙️ **RIBBONWRITER**, an attachment for standard typewriters by means of which from one to five copies may be made without the use of carbon paper, produces letters all of which look like originals. The ribbons of the easy-to-attach and easy-to-use device outlast ordinary ribbons two to one because cushioned from sharp keys by paper.

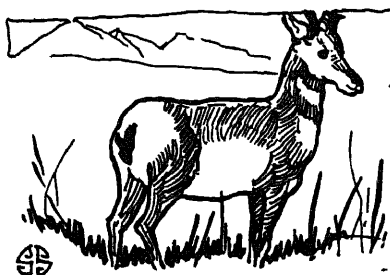
Science News Letter, August 21, 1948

• Nature Ramblings by Frank Thone •

➤ CERTAINLY speediest of all hoofed animals, and perhaps fastest thing that runs on four feet, is the claim advanced on behalf of the pronghorn antelope by Arthur S. Einarsen, leader of the Oregon Cooperative Wildlife Research Unit, in a new book, **THE PRONGHORN ANTELOPE AND ITS MANAGEMENT** (Wildlife Management Institute, \$4).

On their native range, pronghorn frequently get into races with automobiles, running parallel with them, or crossing in front of them on the road. This affords good opportunity for measurement of their speed, in cars with accurate speedometers. A collection of all available records made by Mr. Einarsen, together with his own observations, shows 50 miles an hour as a rather common racing speed for the animals. Once a pronghorn, in the course of such a volunteer race, passed in front of his car which was running at 61 miles an hour. There is also one statement of a 70-mile clip attained by a pronghorn doe. Mr. Einarsen thinks that the only mammal that

Fleetest Hooves



can move faster than that, even for short distances, may be the cheetah, or hunting leopard of the Orient.

Confidence in its ability to run away from any enemy on the ground permits the pronghorn to indulge its highly developed trait of curiosity. Mr. Einarsen tells of pronghorn "kibitzer galleries" that have watched roadbuilding machinery in opera-

tion, in quite human fashion. Even newborn pronghorn kids are intensely inquisitive when approached by humans.

Increase in pronghorn numbers, under hunting restrictions and modern wildlife management methods, need occasion no great concern over their competition with livestock for food plants on the range. Close study of their food habits shows that their first preference is for browsing on sagebrush and other shrubs, then for rangeland weeds, with grass coming in only as third choice. Harm to field crops seems to result more from trampling by herds taking short cuts than by actual feeding.

Despite their great jumping ability, pronghorn do not often sail over even low fences. They much prefer getting under them, and if the bottom wire is as much as a foot above ground the animals can slip through with hardly any check in their speed.

Science News Letter, August 21, 1948

15¢

AUGUST 28, 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

25 OCT 1948



Skulls of Sinai

See Page 138

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VOL. 54 NO. 9

PHYSIOLOGY

Gage Bones' Elasticity

Study aimed at finding out how the human body behaves under different shock conditions. Discover human bones approximate elasticity of wood.

➤ ELASTICITY of human bones is about one-tenth that of steel, or about equal to the elasticity of wood.

This was discovered in tests made in a new research program at the National Bureau of Standards. The new study is aimed at finding out how the human body behaves under shock in airplane crashes, seat-ejection from planes, parachute opening and exposure to blasts. The project is being undertaken in conjunction with the Naval Medical Research Institute.

The scientists first investigated the mechanical properties of human bones and joints, because the skeleton supports the body and protects vital organs.

Specimens were made from compact-type bones from the extremities of both humans and monkeys. They were put through 17 tests with special gages.

Ultimate strength of bones under com-

pression was found to be about 23,000 pounds per square inch. This gives bone a compressive strength of about one-fourth that of cast iron, or twice that of hickory wood. Compression bone specimens failed with a sudden snap and with longitudinal cracking.

On the basis of their preliminary findings, the scientists concluded:

Bone is an elastic, brittle material.

Next study planned in the research program will include tests of the entire human knee-joint in the standing position.

New developments in high-speed aircraft have caused flight personnel to be subjected to shocks and impacts in regular flying as well as accidents, Bureau scientists pointed out. Basic information for the development of new safety devices is expected to come from the research program.

Science News Letter, August 28, 1948

MEDICINE

New Allergy Remedy

Capable of relieving symptoms in 83 per cent of all allergic conditions, "Trimeton" has brought relief to 81 of 90 hay fever patients treated, report indicates.

➤ A NEW DRUG has relieved 90% of hay fever victims treated with it. Dr. Fred W. Wittich, secretary of the American College of Allergists, announces that this will be reported in the ANNALS OF ALLERGY (Aug.-Sept.), official publication of the College.

The new antihistaminic or antiallergic agent is "Trimeton," manufactured by Schering Corp. of Bloomfield, N. J. Its chemical name is prophepyridamine. Its advantages and uses are reported by Dr. Ethan Allan Brown and 12 of his colleagues from the Allergy Clinic of the Boston Dispensary Unit of the New England Medical Center.

Trimeton is credited with relieving symptoms in 83% of all allergic conditions. The study involved 227 patients suffering from 20 allergic and non-allergic conditions including hay fever, bronchial asthma, allergic skin reactions, hives, and angioneurotic edema.

Results reported by the group showed that 81 of 90 patients with hay fever were completely relieved; 15 out of 25 patients with bronchial asthma were markedly relieved and five only moderately; 15 of 22 patients with hives had complete release

from symptoms and three moderate; every one of three patients with both hives and angioneurotic edema had complete relief.

The drug was given in tablet form in doses of 12.5 to 25 milligrams, one to four times daily. Side reactions from the drug, the most common of which was drowsiness, were severe in only two of the patients treated, the physicians reported.

They are carrying on further studies on the relation of blood pressure to side reactions of antihistaminic agents which will be reported upon later.

Science News Letter, August 28, 1948

ENGINEERING

Oil Cooler for Jets Uses Many Aluminum Tubes

➤ DETAILS of an oil cooler for use on jet planes, which takes the heat from the oil and uses it to pre-heat the fuel, have been revealed by its manufacturer, the Clifford division of the Standard-Thomson Corporation of Waltham, Mass. Also revealed are the hot and cold wind tunnels for testing.

The oil cooler is made of brazed and

welded aluminum, saving from 200 to 600 pounds in vital weight in comparison with the copper oil cooler formerly used. There are from 600 to 6,000 aluminum tubes in each cooler. They are six-thousandths of an inch thick. The cooler is now standard equipment for Air Force and Navy planes and is used on many commercial aircraft.

Two wind tunnels are used in the research laboratory of the oil-cooler manufacturer. One, called a hot tunnel, operates normally at 100 degrees Fahrenheit inlet air temperature. The other has capacity to supply to a 24-inch diameter cooler at 60 degrees below zero when rated oil at 225 degrees is flowing through the oil cooler.

Science News Letter, August 28, 1948

ENGINEERING

Size of New Cast Iron Not Altered by Heat

➤ "GROWTH-RESISTANT" cast iron, suitable for use in stoves, furnaces, melting pots and gas or oil burners, was revealed by Battelle Memorial Institute of Columbus, Ohio, where it was developed.

This iron, unlike ordinary iron used for making castings, acquires no permanent extension in size when repeatedly heated in use to high temperatures. The result is it can be employed to make stove tops that will not warp, furnace bowls that remain true and airtight for years, and burner parts that may last indefinitely.

The new iron is a high-silicon product, the silicon being the element which gives it "growth" resistance. It contains also minor amounts of copper and chromium to make it resist scaling at high heat. It maintains satisfactory growth, scaling and impact properties up to 1,700 degrees Fahrenheit. The research resulting in this product was sponsored by the Jackson Iron and Steel Company of Jackson, Ohio.

Science News Letter, August 28, 1948

ICHTHYOLOGY

Rare Fish Species Added To U. S. Museum Collection

➤ FISH MENTIONED in the Bible are included in more than 200 species from the Red Sea being added to the collections of the U. S. National Museum in Washington.

The new specimens were collected during a fisheries survey for the Arabian-American Oil Company by Donald S. Erdman of the Smithsonian Institution.

Another group of weird fish life is being collected for the Museum in the depths of the Atlantic Ocean south of Bermuda by Loren P. Woods, associate curator of fishes. Mr. Woods is in charge of the scientific workers on the *Karyn*, exploration ship of the Woods Hole Oceanographic Laboratory.

These fish will be little-known specimens, adapted to life in darkness under great pressures through millions of years.

Science News Letter, August 28, 1948

SCIENCE
ASTRONOMY

Space and Stars Are Same

Finding that stars were formed out of space helps support recent American theories as to their origin, astronomers learn.

► TWINKLE, twinkle, great big star, Astronomers know just what you are. The self-same stuff is space between, It's atoms rare and quite unseen.

Or, as the astronomers attending the International Astronomical Union meeting in Zurich would put it:

Interstellar matter has the same composition as normal stars.

Space and the stars that shine are much the same, except that the matter in the stars is close together.

This finding reported by Prof. Bengt Stromgren of the University of Copenhagen Observatory helps support some of the latest American theories as to how the stars were formed in the beginning.

Stars were formed out of space material. That is a part of the theory of Prof. Lyman Spitzer, Jr., of Princeton, that atoms in space stick together to form bits of matter. Prof. Fred Whipple of Harvard carried the idea further, showing how the stars and planets were formed.

A chunk of interstellar space the size of a big room contains about 10,000,000 atoms of hydrogen, 60 atoms of sodium, 100 atoms of calcium, four of potassium, and two of titanium, Prof. Stromgren reported.

Although we do not yet know how abundant helium is, about a million atoms of it may be present. All the other elements are also represented, being about as abundant as in normal stars.

Science News Letter, August 28, 1948

Hot Stars' Lives Brief

► IN THE HEAVENS there are spend-thrift stars that in their youth are very brilliant and enormously hot. But these stars soon use up their atomic fuel and disappear from sight.

Tau Scorpii, so hot on the surface it reaches a temperature of 20,000 degrees Centigrade, and similar hot stars generate energy at a prodigious rate during their short but fiery lives of less than 3,000,000,000 years. But much of their hydrogen (astronomical atomic fuel) is soon converted into helium.

As they grow old, they contain little hydrogen and disappear from sight, at least as hot, blue (B-type) stars, Prof. Henry Norris Russell, famed astrophysicist of Princeton University, has reported to the meeting in Zurich.

Prof. Russell's communication was delivered by Dr. Otto Struve, of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas, as chairman

of the symposium on the chemical composition of the universe. He, like many at the meeting, was surprised to hear from Dr. A. Unsold of the University of Kiel, Germany, that the sun, stars and other bright bodies in the heavens have not changed much since they were created.

Even such hot stars as Tau Scorpii, Dr. Unsold found, have kept pretty much their original composition.

There is little difficulty in seeing why nebulae and the matter between the stars have undergone little change. They lack the mechanism which converts hydrogen into helium by means of the famous "carbon cycle," first proposed by Dr. Hans A. Bethe of Cornell University.

The sun and normal cool stars generate energy at such a slow rate that, during their lifetime, they cannot have converted a large amount of hydrogen into helium.

Now astronomers are told that hot stars such as we now see in the sky also have changed little in their lifetime.

Science News Letter, August 28, 1948

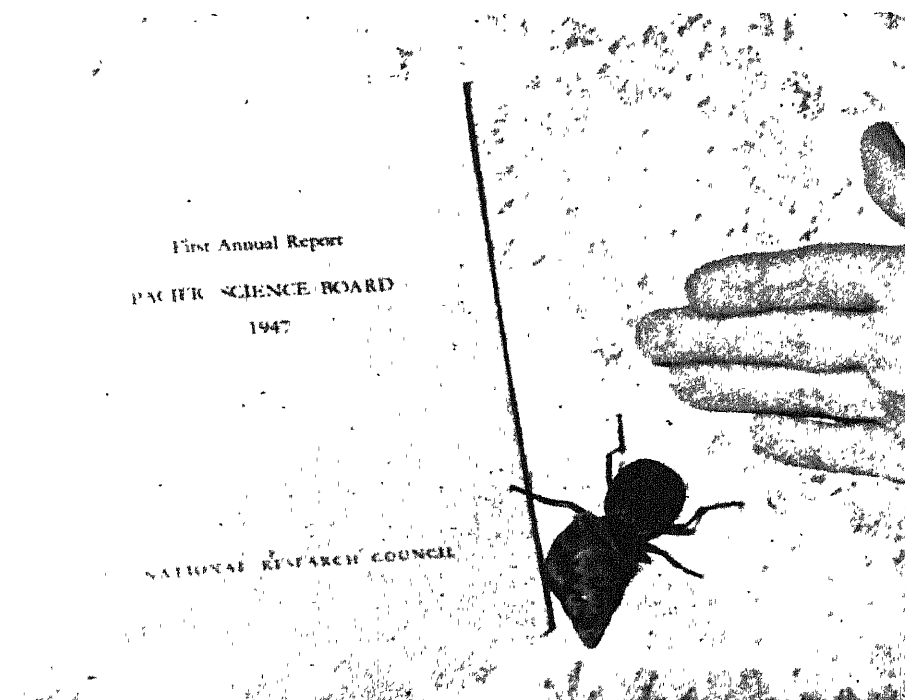
Uranium in Sun and Stars

► URANIUM, the atomic bomb element, is undoubtedly present in the sun and stars, but there is no danger or likelihood that it will explode.

The astronomers learned that changes in the heavier elements were completed when the universe was young. While vast atomic energy is manufactured from hydrogen, power from uranium is not possible under the conditions of the sun.

Long before the stars were formed, the universe may have been in a state of temperature and density which favored the nuclear reactions required to produce the abundances of the heavier elements, Prof. O. Klein of Stockholm's Technological Institute said.

Then, as the stars came into being, the abundances of the heavy elements became "frozen." There exist no nuclear processes which can operate under the present properties of stellar material and appreciably change the abundances of the heavy elements. Only the lighter elements continue



BEETLE VS. THE SNAIL—When the long-legged black beetle, *Tefflus*, attacks the giant African pest-snail, *Achatina fulica*, bet on the smaller but more powerful beetle. The beetle may become an ally of farmers on Pacific islands whose crops are being devoured by the snail, which when full grown gets to be as much as six inches long. The beetles are now being tested in Hawaii where they were brought from Africa by Dr. F. X. Williams of the Pacific Science Board of the National Research Council. (See SNL, July 17.)

Lanlithgow Library.
Imperial Agricultural Research Institute.

their process of metamorphosis.

Science News Letter, August 28, 1948

Stars Have Much Hydrogen

► HYDROGEN is by far the most abundant element in the stars. For every atom of any metal there are about six atoms of carbon, nitrogen and oxygen; 500 atoms of helium; and 5,000 of hydrogen, Dr. A. Unsold of the University of Kiel, Germany, reported at the meeting.

Although we see only the outer layers of a star, we still have a pretty good idea of its total composition. Violent convective currents within the stars keep them constantly stirred up, stated Dr. F. Hoyle of the University of Cambridge, England. Thus the composition of the outer layers, which we observe, is the same as that of the interiors, where the nuclear processes take place.

Science News Letter, August 28, 1948

Letter To The Editor

Allopolyploid Redwood

THAT WAS a good article on my research (SNL, August 21, page 124) except for one thing. I did not call the California Coast redwood a hybrid, but an allopolyploid of hybrid origin. This distinction is more than academic. To the average scientist, whether botanist, zoologist or geneticist, the word "hybrid" refers to an organism like the mule, which is the first generation product of crossing, and is unable to reproduce its own kind, or if it can do so, fails to breed true. On the other hand, the process of doubling the chromosome number converts the hybrid into a full-fledged species which is not only fertile, but faith-

fully reproduces its own kind without undergoing Mendelian or any other kind of genetic segregation. Such allopolyploids are well known as established species in the plant kingdom. Cultivated wheat, cotton, and tobacco are all allopolyploids species which, in my opinion, have originated in the same way as the Coast redwood. However, they have been reproducing their own kind for thousands of years and, of course, cannot be compared to true hybrids like the mule. I don't know what terminology or explanation would put over this point best to the general public, but it seems to me an important one.—G. Ledyard Stebbins, Jr., Professor of Genetics, University of California.

Science News Letter, August 28, 1948

ENGINEERING

Harness Water Power

► PUERTO RICO'S great economic problem, too many people and too few jobs, is promised solution through hydro-electric power. With power available, factories will follow, and jobs will be plentiful. A big start toward the solution is well under way.

This American island, about one-half the size of New Jersey but relatively mountainous, has a population of 2,100,000, or

over 540 persons per square mile. The amount of available farm land is far too little to support its people at any reasonable living standard by agriculture alone. Therefore industries are needed. Without domestic coal or oil, the water in its mountain streams is the logical source of power. It is already being harnessed.

The Puerto Rico Resources Authority,

instituted by the Insular government in 1941, is behind the plans for water development. This agency has the job of the unification of water use for all purposes, including power, irrigation and domestic needs.

Its biggest dam is now near completion. This is a part of the so-called Caonillas project. The Garzas and Dos Bocas projects are already in operation. Fifteen smaller dams are also in use. These 18 together will give the island all the power it needs for the present, some 400,000,000 kilowatt hours per year.

As factories are established to use this power, other projects will be started. The island can produce about twice this amount of electrical energy. It will all be in use by 1970, it is expected.

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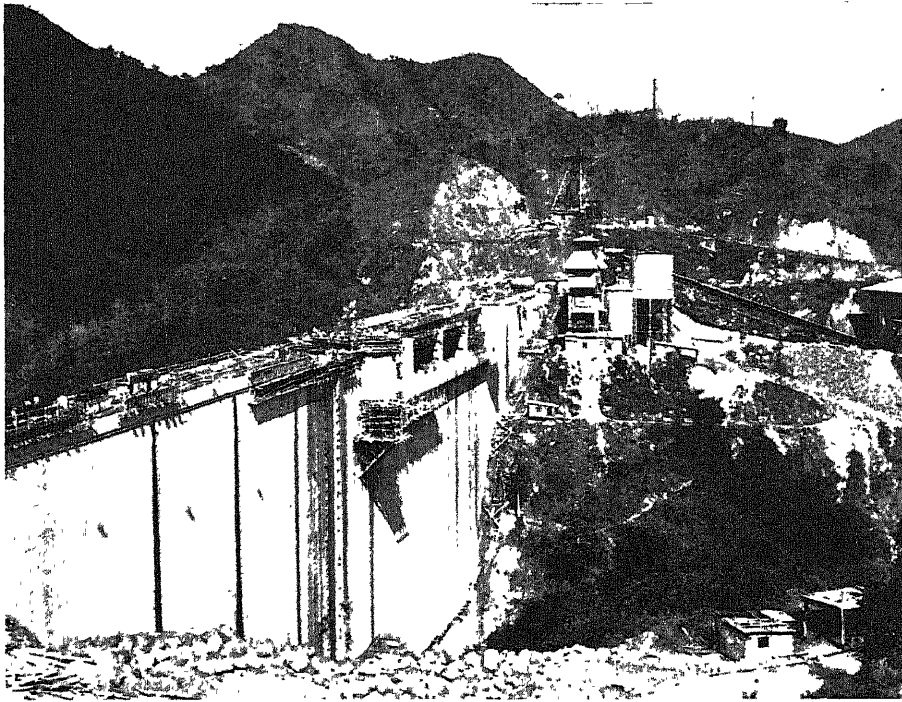
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CAONILLAS DAM—This \$10,000,000 hydro-electric and irrigation project is the largest in Puerto Rico. It is nearing completion between the cities of San Juan and Ponce.

The Caonillas hydro-electric project is midway between San Juan and Ponce, the two principal cities of the island. Together with Garzas and Dos Bocas, it is located in the mountainous central western area of Puerto Rico where the annual rainfall reaches some 200 inches.

The Caonillas dam will stand 230 feet

above stream level. Its reservoir will hold 50,000 acre feet of water. A two-mile tunnel will connect this reservoir with Dos Bocas lake. A five-mile tunnel will later divert water from the headwaters of the Arecibo river into both lakes. Year-around water is thus assured.

Science News Letter, August 28, 1948

VETERINARY MEDICINE

U. S. Eating Unfit Meat

In 1947, 40,000,000 pounds of unfit meat reached the public. Veterinarians also told that human cases of brucellosis are increasing.

➤ "UNSUSPECTING" Americans are eating millions of pounds of unfit meat each year, the American Veterinary Medical Association's convention in San Francisco was warned.

More than 40,000,000 pounds of unfit meat went to public markets last year, the Association's committee on food and hygiene estimated. A report blamed the situation on failure of cities and states to provide complete and adequate veterinary inspection.

About 69% of the meat processed in the U. S. last year came from packing plants under federal veterinary inspection, while the rest was under municipal or state supervision, it was explained.

The report emphasized that complete inspection includes examination of the animal before slaughter as well as after. "Only a few states" have such a program, the committee charged.

Only about one half of the clean poultry sold received veterinary inspection, the report said. Nearly one-twelfth of the poultry inspected was rejected for human consumption.

The report said that 20%—one out of every five quarts—of milk consumed in the nation last year was not pasteurized.

Disease testing and universal pasteurization were stressed in a program recommended for public health.

Science News Letter, August 28, 1948

Brucellosis in Humans

➤ HUMAN CASES of brucellosis, a disease acquired from infected animals, have increased 60-fold in the past two decades, Dr. James H. Steele, Atlanta, Ga., chief veterinarian of the U. S. Public Health Service, reported.

Dr. Steele said that the disease which comes mainly from swine and cattle now ranks with encephalomyelitis (sleeping sickness) and rabies as the most serious threat to public health from animals.

Science News Letter, August 28, 1948

Chicks Get Arthritis

➤ A STRANGE new virus disease which produces arthritis in chickens before they are hatched is a new threat to the nation's food supply.

The disease which strikes turkeys as well as chickens was described to the meeting by the Association's poultry committee. The new disease of embryo chicks has been reported only in the eastern states thus far, the committee said, but it may be more prevalent than is realized.

It causes both respiratory and nervous disorders in poultry. In turkeys, the nervous disturbances are like those from the better-known poultry menace, Newcastle disease. The latter has now spread to all but three states, the committee commented.

Science News Letter, August 28, 1948

Over-Eating in Lambs

➤ A NEW immunizing product and sulfur in feed are two new methods of keeping lambs from literally eating themselves to death.

Drs. A. W. Deem, Rue Jensen and Floyd Cross, all of Fort Collins, Colo., explained that over-eating of grains and other concentrates produces an intestinal poisoning in lambs. Sulfur in the diet or use of a new bacterin were both found effective in preventing loss of lambs from too much food.

Science News Letter, August 28, 1948

Crowding Endangers Calves

➤ ADD to the victims of a housing shortage many calves that are killed by infectious disease, Dr. W. J. Gibbons of the Alabama Polytechnic Institute advised the convention.

Dr. Gibbons explained that too many calves are killed by infectious diseases which they get from older cattle in crowded barns. He urged keeping calves in small, isolated groups of approximately the same age as a means of adding to the nation's meat supply.

Science News Letter, August 28, 1948

Drugs Cause Cattle Loss

➤ PROPAGANDA urging farmers to use penicillin, sulfa drugs and other products

on their livestock may be causing some losses of animals, the convention was told.

When these drugs are used without skilled diagnosis, proper dosage or adequate care, the farmer may not only lose the money spent on the drugs but his animals, the public relations committee of

the Association charged.

"Certain groups and commercial interests who are seeking to exploit the farmer for private gain" were attacked for promoting the sale of these drugs without proper precautions.

Science News Letter, August 28, 1948

VETERINARY MEDICINE

Three-Way Peril to Food

➤ A THREE-WAY THREAT to food supplies in event of an attack with atomic weapons was described by Army scientists to the national convention of the American Veterinary Medical Association in San Francisco.

In atomic warfare, food supplies of human survivors would be endangered by: Loss of livestock and food in the burst area.

"Atomic sickness" of food animals.

Atomic contamination of food supplies.

Fighting these food dangers would be the job of veterinarians, the convention was told by Col. W. O. Kester of the Veterinary Division of the Office of the Army Surgeon General and Maj. E. B. Miller of the Army Medical Library.

Blast injury or damage, burning or scorching and biologic effects on animal tissues and other materials result from an atomic explosion, they reported.

Animal survivors of the Bikini atomic bomb tests showed many of the same symptoms and ills as the Japanese survivors of Hiroshima and Nagasaki. Some of the goats, pigs and rats appeared healthy for several days, although their white blood cell count went down. Within two weeks, some of them died after showing several types of symptoms. Almost no deaths of Bikini animals occurred after the first month, the scientists said.

Science News Letter, August 28, 1948

Testimonials Attacked

➤ TESTIMONIALS by veterinarians of claims made for drugs and foods for animals were labelled "vicious" by Dr. S. W. Haigler of the Association's committee on ethics. He attacked testimonials as a violation of professional ethics and urged state groups and schools of veterinary medicine to encourage progress in adopting a uniform code for veterinarians.

Science News Letter, August 28, 1948

Viruses in Chicken Coop

➤ AIR "RAIDS" in chicken coops are causing losses to valuable supplies of poultry, the veterinarians were warned.

Dr. K. B. DeOme of the University of California described the air attack. It is made by viruses of two poultry diseases. Dr. DeOme reported experiments proving that the diseases are spread by air-borne

transmission. Chickens inhaling air or dust containing the viruses were infected with the diseases.

Ultraviolet lamps and certain chemical vapors were found very effective against the virus of the disease, laryngotracheitis, he explained. But against the virus of the dread Newcastle disease of chickens, these anti-air-virus weapons were much less effective, it was discovered.

Science News Letter, August 28, 1948

OPTICS

Dark Glasses Worn by Night Drivers Are Unsafe

➤ DARK GLASSES, worn at night by automobile drivers to relieve the glare from on-coming headlights, are often a hazard, the National Bureau of Standards finds in a recent investigation of protective glasses and goggles. They decrease visibility.

Most types of combinations of shaded glasses have been found to be unsafe as a means of protection against glare from automobile headlights, Ralph Stair of the Bureau staff states. In general it is the belief that any advantage of reducing glare from car headlights by wearing dark glasses is more than counterbalanced by the extra hazard arising from the decreased visibility of objects.

Tests by a number of observers indicate, however, some basis for claims of increased visibility and reduction of glare through the use of yellow glass. Dark glasses are an active aid in glaring sunlight. They cut the brightness to a comfortable value such that the protective mechanism of the eye can assume control of the radiant energy reaching the retina.

Eyeglasses are essential for workers in many types of occupations, the Bureau emphasizes. But they must be adapted to the particular job. In operations such as welding with coated rods, or in aluminum or magnesium welding and cutting, producing high radiant flux at the wavelengths of sodium lines, glasses containing didymium have been found useful. Glassblowers also need didymium glasses because ordinary glass, with its high sodium content, gives off an intense yellow flare when heated.

Special cobalt-blue glasses have been used and demanded by operators of open-hearth furnaces, in the particular shade with

which the operator is familiar, because of the contrast in brightness between the molten metal and the interior of the furnace. Blue-amber glasses are worn by operators in the Bessemer steel-producing process because with them they can note certain color changes of the flame as the impurities are burned off.

When glasses having a high optical density are worn for protection of the eyes in industrial operations, the elimination of harmful ultraviolet rays must be given first attention. Infra-red rays, which are heat waves, can be given second consideration because a worker is generally forewarned by a burning sensation.

Science News Letter, August 28, 1948

AGRICULTURE

Farmer Who Trapped Skunks Lost His Ducks to Turtles

➤ A FARMER complained that he lost his ducks when he began trapping skunks. He was the victim of a sort of biological "chain reaction."

The mystery of the missing ducks is told by Dr. Edward H. Graham, chief of the biology division of the Soil Conservation Services of the U. S. Department of Agriculture.

The key to the farmer's skunk-duck troubles turned out to be turtles. It worked this way:

The farmer trapped the skunks. The skunks had been eating the eggs of snapping turtles. The turtles multiplied as the skunks were caught. Then the turtles began to feed on the ducklings.

The moral, says Dr. Graham, is: Think in terms of interrelationships rather than simple cause and effect in dealing with nature.

Science News Letter, August 28, 1948

INVENTION

Buzzer Warns Fisherman When Fish Is Hooked

➤ AN ELECTRICAL GADGET that can be a good friend both to the very lazy fisherman and the very busy one has been invented by Antoni Linder of Chicago, and is covered by U. S. patent 2,446,427.

It is built essentially like a door or desk buzzer, only instead of having a button to push it has a hook to pull. The fisherman's line is made fast to this hook, and when a fish bites, the tug transmitted through the line closes the contact and sounds the buzzer.

The lazy, vacationing fisherman, with one line out, can lean back and snooze, or sit up and play bridge or engage in whatever other activity may be going on aboard, until the buzzer sounds. On the other hand, the busy commercial fisherman, who may have a dozen or more lines out at once, will be notified by the buzzer whenever a fish is waiting to be hauled in.

Science News Letter, August 28, 1948

NUTRITION-PSYCHIATRY

Poor Diet Affects Mind

Lack of vitamin B complex in diet produces mental abnormality within two years if the deficiency is not drastic, tests with patients show.

➤ **LIVING ON A DIET** which does not contain enough of the vitamin B complex ordinarily obtained from meat or whole grains causes mental abnormality. This was found in an experiment with a small group of men patients at the State Hospital in Elgin, Ill.

The changes come slowly and insidiously, if the dietary deficiency is not drastic. Decline in mental ability may not be noticed until after about 18 months of poor diet and then no one can be certain of a definite date when the symptoms started.

Men who had been moving about actively, helping in the ward work or talking to one another, lost interest and ambition, became dull, sat in their chairs or lay on their beds. They were disinterested in their surroundings.

These symptoms occurred in one group of 12 men patients whose diet contained plenty of all the essential nutritional elements except that the vitamin B content was reduced from a normal 1,200-2,000 micrograms to 400 micrograms, or about a third of normal. (A microgram is a unit of weight equal to 35 billionths of an ounce.) The riboflavin was cut from a normal of 1,600 to 2,600 to 800 micrograms, or about half.

Much more dramatic results occurred with another group for which the riboflavin intake was cut to 800 daily and the thiamin to 200 micrograms.

After only four to six months on this more severely restricted diet, mental abnormalities became much worse. One old man who had been quite amiable, became infuriated and threatened to break up the furniture and escape. A young man who had been subject to bad temper fits which ordinarily lasted a minute or so, once or twice a year, went into blind rages.

These occurred in quick succession and lasted a half hour to an hour. During this time, he would scream at the top of his lungs, throw heavy objects at anyone within reach and curse at the women attendants.

Just as dramatic as the onset of these symptoms was the recovery when the inadequate diet was supplemented with yeast extract to provide the missing vitamin B.

The rage of the terrible-tempered old man subsided overnight and he became his former amiable self again. The young man who had endangered the lives of all around him, appeared self-controlled the day after he was given the vitamin B. Only one old man took several weeks to regain his former contentedness.

Patients on the less severely restricted diet whose mental abnormalities had been

very slow and gradual in development were also comparatively slow in recovery.

Persons who have a low energy output can get along for a longer period on a diet lacking somewhat in vitamin B, the investigators conclude. They found that the regressed patients with schizophrenia, who ordinarily have interests and ambitions dulled and are relatively inactive showed the changes later than did the patients with cerebral arteriosclerosis and other mental illnesses not associated with general decrease of energy output.

Because of the slow and insidious way that mental symptoms appear, it is not possible, the investigators feel, to be sure that a diet is not dangerously deficient in vitamin B, if study of it is not continued for at least two years. Details of the study are reported in the *AMERICAN JOURNAL OF PSYCHIATRY* (August).

Science News Letter, August 28, 1948

BACTERIOLOGY

New Laboratory Set Up To Study Shellfish Bacteria

➤ **A NEW ATTACK** on the bacteria which can infect oysters, clams and mussels and in turn infect the people who eat shellfish will be made in a new laboratory of the U. S. Public Health Service at the Woods Hole Oceanographic Institution.

Scientists at the laboratory will study shellfish bacteria and determine any changes needed in present shellfish-raising regulations. Oysters, soft clams, hard clams, and mussels will be included in experiments.

James L. Dallas, who is on leave from the Massachusetts Department of Health, will head the new laboratory.

Science News Letter, August 28, 1948

BOTANY

More Vanilla Expected From New Experiments

➤ **VANILLA** will presently become more abundant, and possibly more fragrantly flavored, as a result of experiments conducted at Cornell University by Prof. Lewis Knudson. He has succeeded, through the use of a special nutrient medium, in germinating the seeds of the vanilla vine, once considered an impossible botanical feat.

Two hundred hybrid vanilla seedlings have now been shipped to the U. S. Agricultural Experiment Station in Puerto Rico, where they will be tested for resistance to

root disease and for quality and quantity of yield.

The best vines will be propagated by cuttings. If vanilla grows well in Puerto Rico, the island's contribution to this country's \$10,000,000 annual demand for the flavoring beans will do something towards relieving its chronic rural unemployment.

Science News Letter, August 28, 1948

INVENTION

Age of Eggs Revealed by Color Under Ultraviolet

➤ **OLD EGGS** can be separated from fresh ones by their color under ultraviolet light. This was revealed by Willett R. Wilson, a Westinghouse lamp engineer who has been experimenting with the effects of this invisible "black light" for years.

In the ultraviolet light an old egg shows up purple while a really fresh egg glows scarlet. The outer shell of a hen's egg and its protein covering are fluorescent, he explained. Probably the color switch occurs when oxidation causes a chemical change in the shell.

Ordinarily, unrefrigerated eggs kept under average temperature and humidity turn gradually from a scarlet fluorescence to purple in eight to ten days. Properly refrigerated eggs retain their freshness and scarlet fluorescence longer. Brown eggs and white eggs both show scarlet under black light if they are fresh.

Science News Letter, August 28, 1948



FRESH OR OLD EGGS?—Invisible ultraviolet rays differentiate old from fresh eggs by their color under a black light projection unit. Fresh eggs glow scarlet and old eggs purple, new Westinghouse tests show.

ELECTRONICS-CHEMISTRY

Electro-Chemical Research To Boost India's Progress

► A NOTABLE STEP in India's progress in science and the application of science to economic advancement was the recent cornerstone laying in Karaikudi of an electro-chemical research institution. Its work will be along the lines followed by similar institutes in America and elsewhere.

The first building of the institute, a laboratory, will be ready for use in about a year. Other construction will require another year or two. The investigations to be made will cover problems in electrolytic and electro-thermy fields. They will include the production of heavy water, other inorganic and organic chemicals by electro-chemical methods, electrode position, electro-metallurgy, primary and secondary cells and electric furnaces.

Adjacent to this research institute, which will be on a 300-acre tract of land presented by a private citizen, will be an engineering college, a research institute in higher mathematics, and a technological and polytechnic institute. Together they will become an important center to bolster India's industrial activities and promote the use of Indian raw materials.

While the per capita consumption of electricity in India is low compared to the United States and Britain, it is expected that before long it will increase very much, thanks to the setting up of vast hydro-electrical power projects all over the country. This, coupled with the availability of key raw materials and labor resources, will probably lead to a rapid growth of the electro-chemical industries.

Science News Letter, August 28, 1948

ZOOLOGY

Where Gerbils Stop and Baboons Begin Is Found

► WHERE the gerbils stop and the baboons begin has been discovered by the University of California African Expedition.

It is where desert animals, such as the gerbil, a mouse which stores fat in its tail, begin to disappear and animals of the African Sudan are seen.

Dr. Ernst Schwarz, zoologist with the U. S. Navy medical group, headed a group which traveled down the east bank of the Nile, from the southern border of Egypt through Anglo-Egyptian Sudan to the border of Uganda.

At the Atbara river, in northern Sudan, the dividing line seemed to be found. Baboons and antelopes were seen instead of gerbils, the Dorcas gazelle and the Mediterranean fox.

Another zoological dividing line was found in the Sudan, at the Sobat river, where Uganda animals were first found. But this division was less clear cut, because

of an ancient forest which was once there. In the mountains of the region are found strange monkeys, including the blue monkey, the black mangabey and blue duiker.

Investigation by Dr. Schwarz has disproved previous reports that the Norway rat, common pest in both Europe and America, was found in this part of Africa. He found the black rat, or plague rat, which is less common in the U. S. and Europe, but no Norway rats.

Science News Letter, August 28, 1948

PUBLIC HEALTH

People Live Longer in West North Central States

► PEOPLE LIVE LONGER in Nebraska than in any other state. Healthiest section of the nation, from the standpoint of length of life, is the West North Central states: Minnesota, the Dakotas, Nebraska, Iowa, Kansas and Missouri.

These facts were disclosed in new tables for white population worked out by the Statistical Bureau of the Metropolitan Life Insurance Company under the auspices of the National Office of Vital Statistics of the U. S. Public Health Service.

Women in the West North Central states live to be more than 69 years old, while men average over 65.

Shortest length of life is in the Mountain states: Idaho, Montana, Wyoming, Colorado, Utah, Nevada, Arizona and New Mexico. Men average 60.98 years and women, 66.03 in that region. High death rates for the Spanish-speaking populations of Arizona and New Mexico helped lower the average, it was pointed out.

Shortest average length of life for men is in Arizona, while women have the shortest life span in New Mexico.

Lowest death rates for a person between 25 and 45 years old are in New England. But at 45, the average New Englander has a life expectancy of only 25.37 years, compared with 27.56 years for the West North Central states.

Dividing the country into three sections, the statisticians found that the North has the longest average length of life, followed by the South and the West.

Men in the North have an average life expectancy of 63.43 years at birth; women, 67.51 years. Men live to be slightly older in the South than in the West, but women live longer in the West.

The newly-published figures for regional life expectancy were compiled for the years 1939-41.

Reasons for the differences in length of life in different regions include several factors, it was pointed out. General standard of living, degree of industrialization, density of population, adequacy and availability of medical and hospital facilities and climate are mentioned as some of the possible reasons for the differences found in the new tables.

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PUBLIC HEALTH

Doctors Increase Faster Than U. S. Population

► THERE ARE 17% more doctors today than there were in 1940 while the population of the United States has increased only 12% in the same length of time.

Dr. Frank G. Dickinson, director of the American Medical Association's Bureau of Medical Economic Research, estimates on the basis of punch card tabulation that on June 1 there were 199,755 living physicians in this country. In 1940 the A. M. A. Directory listed only 170,163.

Some of these doctors are retired, some are not in practice and some are employed by federal, state and local health agencies, Dr. Dickinson points out.

Five states with more than 10,000 doctors are New York, 30,970; California, 16,069; Pennsylvania, 14,633; Illinois, 13,307; and Ohio, 10,091. Dr. Dickinson cautions that these figures are tentative, owing to unrecorded deaths, interstate migrations, and to other factors.

Five states with fewer than 500 doctors are: Nevada, with 198; Wyoming, 252; Delaware, 439; North Dakota, 467; and Idaho, 470.

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PHYSICS

Tiny Crystals Put in Thin Casts for Study

► CRYSTALS which are invisible in any existing microscope are now being put in casts a millionth of an inch thick so that their structure can be seen.

The tiny crystals are so small that they can not be seen with an ordinary microscope, and they will not let streams of electrons through them for study with an electron microscope.

C. J. Calbick of the Bell Telephone Laboratories, Murray Hill, N. J., reported at the International Congress of Crystallography held at Harvard University that models of the crystals which can be studied with an electron microscope have been made.

Each crystal is coated with a thin film of silica, the main ingredient of sand. Then the crystal is dissolved in acid, leaving the thin silica wall as a replica of its surface. This shell is transparent to electrons.

Two different views of the crystal shell, seen through the electron microscope, give a three-dimensional picture of the crystal. The same principle is used to give depth to pictures seen through a parlor stereoscope.

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ENTOMOLOGY

Flies That Survive DDT Discovered in New York

➤ NEW EVIDENCE that some house flies are getting too tough for DDT was reported at the annual open house of the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

Drs. John B. Schmitt and George W. Barber, both of Rutgers University, said that DDT-resistant flies had been tested in the laboratory after they were captured in a New York resort hotel.

An exterminator discovered the flies when three sprayings with DDT failed to kill them, where one spraying had formerly done the job. The scientists checked the exterminator's methods and then reared three generations of the flies which were resistant to DDT.

Other insecticides, including Chlordane, were found to kill the flies which survived DDT. Detailed results of the experiments will be published soon.

U. S. Department of Agriculture scientists have reported raising DDT-resistant flies in the laboratory through more than 30 generations.

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PSYCHOLOGY

Personality Is Guide To Choice of Friends

➤ "CAN tell good jokes."

"Doesn't hurt people's feelings."

"Saves me a seat so I won't have to sit with the girls at lunch."

These are typical of the reasons boys and girls have for picking their best friends, as found by Drs. Mary C. Austin and George G. Thompson of Syracuse University. The psychologists questioned 404 sixth grade pupils in seven elementary schools.

It is personality that is important among friends in this younger set—more important than mutual tastes or interests. And when friends are dropped from the list—as some were after two weeks—it is the ex-friends' behavior that is to blame.

Cheerfulness, kindness, honesty and generosity are the most important qualities to children when it comes to picking friends. They revealed this in what they put down when they made a list for the psychologists showing their three best friends and their reasons for choosing them and in the list they made two weeks later showing how their opinions had changed.

"She has not been wanting to be friends—he thinks he is 'hot'—he stole my girl friend away—she is always treating me mean," they charged when they dropped a friend.

Sixth graders tend to be fickle. Approximately 60% of them made some changes in their list of best friends within two weeks.

Children naturally made more friends with others who lived nearby, but nearness alone was not enough. "Out of sight, out of mind" seemed to be generally true since lack of recent contact accounted for 14.5% of the broken friendships.

The psychologists concluded from this that parents could help their children's social progress by providing play rooms and shops which would attract other children, since it is very important to popularity-rating for a child to keep in contact with others.

They also noted that broad interests and tastes are important to children's happiness. Parents who try to restrict their children's interests are hindering their social development.

Science News Letter, August 28, 1948

NUTRITION

Canned Fish Spreads Are Being Developed

➤ YOU MAY be adding fish spreads to the menu soon if the experiments of Norman D. Jarvis, food technologist for the Fish and Wildlife Service, are successful.

Finished formula for the spread has not yet been perfected, but Mr. Jarvis hopes to have it ready by the end of the year.

The fish spreads contain tomato, dried skim milk, margarine, flour and a small amount of seasoning as well as fish. The tomato is for color, flour acts as a binder and milk adds food value.

Mr. Jarvis has tried more than 40 species of fish. Best ones for making fish spreads are chum salmon, mackerel, pollock, lake herring, and rosefish.

Fish spreads on the market now are imported from Europe and made for a limited, high-priced market. Mr. Jarvis' canned fish spreads are inexpensive and planned for possible use in the Federal-aided school lunch programs.

Science News Letter, August 28, 1948

MEDICINE

Five-Year Grants to Aid Young Medical Scientists

➤ FUNDS for helping relieve the shortage of teachers in medical schools and for encouraging research in medicine are being granted to young medical scientists by the John and Mary R. Markle Foundation in New York.

The grants are made for five years at a rate of \$5,000 a year to young scientists who have completed their training. Now being awarded are grants for the school year 1949-50. Men and women receiving these grants will be appointed as full-time teachers on the staffs of medical schools. Schools will nominate candidates.

Science News Letter, August 28, 1948

ARCHAEOLOGY

Outlines of Mysterious "Lost Colony" Fort Found

➤ THE OUTLINES of the fort which was built and then mysteriously deserted by Sir Walter Raleigh's "lost colonists" at Roanoke Island, N. C., have been located in recent archaeological surveys made by J. C. Harrington of the National Park Service.

The Roanoke colony, which represented the first English attempt to colonize within the continental United States, was first settled in 1587. Then Governor John White left his colony and returned to England. When he returned in 1591 he found no trace of the settlers but the strange word "Croatan" carved on a tree.

The fort has an unusual outline, with bastions on the sides of the basic square rather than on the corners. Two pointed bastions commanded the approach to the water. There is a rounded bastion on the south side which may have enclosed a building and an entrance facing west, probably toward the settlement.

Science News Letter, August 28, 1948

PSYCHOLOGY

Fear Is Produced in Laboratory Experiments

➤ FEAR has been produced in the laboratory for experiments by putting a man in a chair and suddenly letting the chair drop backwards at a 60-degree angle. This was done so that what happened to the subject psychologically could be measured.

This scientific use of the chair "gag" was described by Dr. Martin L. Reymert, director of the Mooseheart Laboratory for Child Research, as a guest of Watson Davis, director of Science Service, on Adventures in Science over the Columbia network.

These experiments disproved a theory held by earlier psychologists that the emotion of fear is a result of the way the body changes when faced by a frightening experience. According to the old theory, first we see a bear, then we begin to run and then we feel fear.

Pounding heart, rapid breath and other body changes, just like those which result from fear, can be produced by running upstairs or sawing wood. But in this case there is no real feeling of fear, experiments show.

There are many emotions—love, hate, sorrow, anxiety, shame—but no unique pattern of body changes to distinguish each, Dr. Reymert pointed out.

According to a more recent view, emotions are governed by a particular section of the brain known as the thalamus.

This idea fits the facts better than did the earlier theory but there is a great deal of work still to be done before emotions are really understood, Dr. Reymert said.

Science News Letter, August 28, 1948

ARCHAEOLOGY

Uncovering Africa's Past

Starting with the Sinai peninsula, the University of California African Expedition has penetrated into the continent proper making many startling discoveries.

By Dr. FRANK THONE

See Front Cover

➤ AFRICA has for centuries exerted on men's minds the fascination of unsolved mystery. It was so to the Greco-Roman world of antiquity, to which Ethiopia meant Farthest South; it was still so to our own grandparents of the mid-nineteenth century, who thrilled to the unknown when they uttered their favorite geographical cliché, "Darkest Africa."

Much of the darkness has been dispelled from over the great continent. You can go to the railway station in Cairo and buy a through ticket to Capetown, airplanes droning over the Congo are so commonplace that natives no longer bother to look up at them, and the descendants of Herodotus' "anthropophagi" (cannibals, to you) conduct decorous classes in Sunday school.

But the mystery of Africa has only been breached, not dissipated. Partial answering of some questions has only sharpened the need for finding fuller answers. Many of the most brilliant discoveries of the past two or three generations of exploration have only opened up windows on new and challenging vistas of the unknown.

Delving into Antiquity

Acquaintance with Africa's many and highly varied peoples, for example, has raised questions of where they came from, how they got there, and what can be done to make their future pleasanter and more profitable for them than their immediate past. Chance scattered discoveries of fossils representing remoter antiquity of man and his relatives, like the famous Rhodesian Man skull, and more recently the puzzling bones of manlike apes in South Africa, have broadened and intensified the challenge to dig up more parts of the puzzle and piece them together into a completer picture.

Most ambitious and far-reaching acceptance of that challenge thus far is provided by the University of California African Expedition, which has undertaken a sweep over the entire continent from north to south, finding out everything possible about present peoples and about the still-unfathomed past. It has already been in the field for many months, with a staff of a score or more trained graduate workers. Its leader is Wendell Phillips, with energetic young William B. Terry as field executive. Africa's own scientists, from Egypt to the Union of

South Africa, have participated in the program. Results are beginning to roll in, some of them along expected lines, others quite unlooked-for and dramatic.

One of the first regions to be examined was not properly in Africa itself, but rather upon the threshold between Africa and Asia. This is the Sinai peninsula, where the Children of Israel wandered on their way from Egypt to the Promised Land, and where Moses received the tables of the Law.

Wanderers Before Moses

There were wanderers there long before Moses, abundant evidence showed. At Rawafi was found a site of early Old Stone Age, with several hundred almost perfect stone hand-axes right on the surface. These were of the primitive type used by Neanderthal Man. Farther to the southwest in Sinai, two more Old Stone Age sites were discovered, with implements of the same type. The presence of such large numbers of stone tools at Rawafi suggests that this was no mere campsite or temporary settlement, but a center of Stone Age industry—a kind of paleolithic Pittsburgh. These sites on Sinai are also of importance as markers on Neanderthal Man's migration from his presumed original home in Asia into Africa.

Thirteen skulls, taken from tombs in the Sinai region, are shown on the cover of this week's SCIENCE NEWS LETTER. Mrs. Gladys Terry, wife of the Expedition's field executive, is shown in the background.

Search for traces of the remote past in Egypt centered in the Faiyum, a wide lowland west of the Nile valley, that was once the bed of a vast lake. This was far back in Ice Age times, when the climate of northern Africa was rainy and the land was rich with vegetation where it now is desert. Terraces on the sides of the dry hills mark the levels of the lake as it gradually shrank, as similar terraces in Utah and Nevada mark the stages of the vast Ice Age ancestor of the present much-shrunken Great Salt Lake.

During Egypt's great days, the Faiyum was a rich province ruled by governors of the Pharaohs, and there were elaborate irrigation works and canals. An airplane was used in scouting for the remains of these canals, now choked with desert sand. Some were found as recent as the reign of Cleopatra, Egypt's last independent monarch. Others proved to be older than any recorded dynasty on the Nile.

These earliest canals were the work of farmers of the New Stone Age, or Neolithic, when agriculture was still something new under the sun. Particularly active in finding village sites and other remains of these Egyptians who were before any Pharaoh was Dr. S. A. Huzayyin, modern Egypt's leading prehistorian.

Still older than these remains, older than any human occupation, were bones that gave evidence that what was a great lake in early human times was an arm of the sea before that. Most convincing of these bones are the remains of a primitive kind of whale known as Zeuglodon; two practically complete forty-foot skeletons of these great sea-beasts were found "chasing each other" in what the workers promptly christened Zeuglodon Valley. Other remains of aquatic animals included bones of crocodiles, turtles and hippopotamuses, belonging to the later, fresh-water phase of the region.

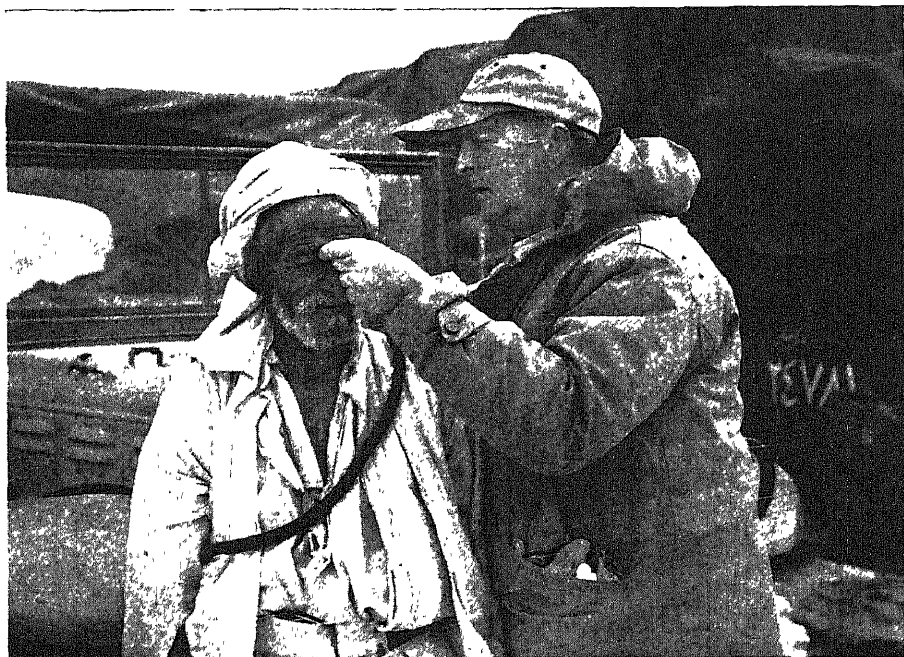
Then the expedition shifted base farther south, into the Sudan. Here the main concern was with the present-day population and its health troubles—which are many. Diseases that are rarities, hardly more than names, to doctors in the temperate zones are everyday commonplaces in the clinics of the Sudan. The medical personnel of the expedition were joined by four U. S. Navy men—a doctor, two parasitologists and a photographer—and together they saw their fill of such outlandish and distressing ailments as elephantiasis, schistosomiasis, loa-loa, bilharzia and sleeping sickness.

Elephant Shrew

Here also the medical men struck a jackpot, in the shape of an addition to the scanty list of animals susceptible to malaria and hence of value in research on that scourge of the human race. This is the elephant shrew, a long-tailed, flexible-nosed little animal that looks like an oversized mouse but isn't a rodent at all. A collection of 104 of these animals was flown directly from the Sudan to Washington, where they are housed at the National Zoological Park, with medical research men from the Naval Research Center busily at work on them. (See SNL, June 12).

At all the expedition's stops, its physical anthropologist, Dr. Henry Field of Washington, D. C., took detailed head and body measurements of the natives. He got data on 225 Beduins in the Sinai peninsula, 190 inhabitants of the village of Tamiya in the Faiyum, 120 "Fuzzy-Wuzzies" in the Sudan, and 150 Masai in Kenya.

The expedition is now in Kenya, where the remote, pre-human past has again come in for attention. Ape teeth of Miocene age (perhaps 40,000,000 years) have been found in the Lake Rudolf area by a South



HEAD MEASUREMENT—A Beduin is shown patiently submitting to measurement of his head by Dr. Henry Field for comparison with skulls found in tombs.

African paleontologist, Dr. Basil Cooke, and by Dr. Robert Denison of Dartmouth College.

In the meantime, measurements of the living human inhabitants are being made by an Egyptian anthropologist, Dr. Mohammed Mitwally of Farouk University in Alexandria. A colleague of his, Dr. Mohammed Awad, is studying the fossils of invertebrate animals near Mombasa.

A special job is being done on the Masai people of the region by a leading Hollywood technologist, Arch Obeler, who is making sound recordings of their ceremonies, and films for television broadcasts.

A unique feature is the recording of the Masai blood-letting ceremony, a ritual which strangers have hitherto rarely been permitted to witness.

Plans for the future of the expedition include more tropical medical research, in the Congo, British East Africa, French Equatorial Africa and Portuguese East Africa or Mozambique. A cave at Lady-smith, in the Union of South Africa, is to be excavated, and with luck should yield still further information on ancient human and sub-human life on the no-longer "Dark Continent."

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PSYCHOLOGY

Recall Painful Memories

► **WHAT ARE** your most unpleasant memories of your childhood? Did you break an arm? Or get sent to bed as punishment? Or cheat on a spelling test?

These are some of the things which 150 college girls recalled as their most unpleasant memories when they were tested by Dr. George G. Thompson and Sam L. Witryol of the Syracuse University School of Education.

The investigators found that painful injuries were the most frequently remembered unpleasant experience of the first five years of life. From 6 to 12 years, being forced to do unpleasant things headed the list, and from 12 to 18 years, deaths of friends or relatives were recalled most often.

Injuries ranged from "cutting finger with razor" to broken bones. Some of the unpleasant things which the girls recalled being forced to do included:

"Had to practice on cornet."

"Having to kiss relatives."

"Being sent to principal's office for punishment."

From the earliest years, the unpleasant memories other than injuries included such things as sensory irritations ("taking castor oil"), illness, loss of personal property, corporal punishment and being attacked by animals.

But from 6 to 12, being "yelled at," teasing, fears, fighting, trips to doctors and sense of guilt became more important.

One girl recalled her sense of guilt, "Hit

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Do You Know?

In Greece, *sheep* are raised primarily for milk.

Male *tigers* sometimes weigh 600 pounds; females seldom exceed 300 pounds.

Scientific research has been called the fourth dimension of industry.

Good sources of *vitamin A* include liver, sweet potatoes, carrots, spinach, greens, apricots, tomatoes and peas.

Pre-emergence weeding is a new phrase in gardening; it is the growing practice of applying weed-killing chemicals to planted fields before the crop plants have come up.

Motor vehicle *drivers* who drive at a steady rate, at moderate speeds, and accelerate gradually get the best mileage from the gasoline used.

People who cut timber without permission on land not their own are called "*grandmaulers*" in the Ozarks, the mountain area of Missouri and Arkansas.

Railroads carry approximately 70% of America's *freight*; the rest is carried by trucks, inland water boats, pipelines and aircraft.

The towering Empire State Building in New York City is being used in research on *lightning*; it is struck by lightning many times each summer, often as frequently as 48 times.

The *Stillingia tree*, also known as the Chinese tallow tree, grows in the southwestern part of the United States, including Texas, and produces an oil-bearing seed which yields an oil suitable for use in paints and varnishes.

my sister with a brick and felt bad."

Between 12 and 18, school failure, being refused desired objects, loss of friends, quarrels with parents, breaking up with boy friends, inferiority feelings, seeing accidents and lack of popularity were among the most often remembered.

Reporting their findings in the JOURNAL OF GENETIC PSYCHOLOGY, the scientists suggest that the 6- to 12-year group may be forced to adapt too rapidly to social rules and conventions. Problems of the older group, they believe, may be partially blamed on "the educational, social and economic philosophy" of today. Parents and teachers ought to do more to build up a youth's sense of personal worth in this stage, the investigators urge.

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CHEMISTRY-PHYSICS

Non-Radioactive Tracers

➤ A RADAR research discovery during the war now makes it possible to trace chemical elements in some parts of the body without the use of hazardous radioactive isotopes.

The microwave spectroscope uses waves of the same length as radar to detect even tiny amounts of chemical elements.

Stable isotopes of elements, which differ only in atomic weight from the usual form of the element, can be fed to humans, animals or plants. The element may end up in the skin, hair or nails of an animal being tested, or in any part of a plant. It must be in some part that is detachable to be traced since the spectroscope can only be used on a small specimen. The part being tested is placed in the spectroscope where it will intercept microwaves and cancel out those frequencies corresponding to the isotopes of elements it contains.

Development of the microwave spectroscope is the result of work done at the Research Laboratory of Electronics of the Massachusetts Institute of Technology.

Radioactive isotopes which have been used to trace the distribution of elements

and compounds in living organisms have a much wider range of uses than the stable isotopes. However, these isotopes are dangerous to life if given in too large amounts. Radioactivity poisoning, which causes burns and in larger doses, disintegration of cells, might result.

Radioactive isotopes are also more expensive. They are used in such experiments because they can be traced with a Geiger-Muller counter.

Microwave research began during the war when scientists working on radar discovered that certain wavelengths used in radar were absorbed by gases in the atmosphere. At the Radiation Laboratory at M. I. T. and at Columbia University, projects were started to find out what gases interfered with what wavelengths. It was found that water vapor and oxygen absorbed microwaves in such a way that they defined the limits of usable radar waves.

After the war these discoveries led to work in the detection of gases by microwave spectroscopy and from there to the use of these waves in exploring matter.

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CHEMISTRY

Chemists' Newer Methods

➤ CHEMICAL INDUSTRY is using cool and quiet processes to replace the fire and brimstone that are the traditional accompaniments of the chemist, the magazine CHEMISTRY says in its July issue.

Methods called catalysis and ion exchange are supplementing the refining by fire and the distillation by heat that have come to be associated with chemical processes. The editorial comment in this Science Service publication continues: Doubtless the flames, the smells and the noises issuing from primitive laboratories fostered the legend that the experimenter within had sold his soul to the devil.

Early chemists had few processes to work with. Through the verbal mists they created with their obscure language it is occasionally possible to make out the alchemists' directions and recognize the processes they were trying to carry out. The most surprising thing about them is the roundabout way they worked.

Trained in metal refining, their work was all with fire. Solution and precipitation "in the wet way" was still undreamed of.

It was an important step ahead when the alchemists discovered distillation. The process must have seemed mysterious to them, and absurdly simple.

In the same way, today, old fogies may still be found who scoff at new methods which take advantage of small surface forces—catalysis and ion-exchange. "What's

so wonderful," they ask, "about just running a solution through a pipe?"

The steps in development of chemical industry are not unlike those in the development of machine design. As the creaks and bangs of primitive machines have been replaced by the purr of the modern motor, the violence of early chemical processes is being superseded by methods which take advantage of quieter forces.

Catalysis often persuades chemicals into combinations that heat and pressure can scarcely force them into. Ion exchange accomplishes, seemingly without effort, what distillation, with its expensive energy changes, balks at.

Soon photosynthesis will join the list of methods which will replace the alchemists' Little Tophet with a chemical factory as quiet and restful as nature's factory, the cool green forest.

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The age of *wild quail*, a favorite game bird in much of the United States, can be quite accurately told by experts from their size and their feather development.

Some American cities are washing *streets* with a mixture of one gallon of a commercial detergent made from petroleum added to each 2,000 gallons of water; the application leaves a thick layer of foam on the surface which lasts for 30 minutes,

PUBLIC HEALTH

Your Handkerchief Enemy

Scientists estimate that a used handkerchief is probably the most important single method of spreading germs. Best aerial disinfectants appear ineffective.

➤ YOUR HANDKERCHIEF is a powerful weapon of germ warfare.

A scientific estimate is that your handkerchief can unleash a bombardment of 136,000 germ particles.

This is the average for 211 handkerchiefs which were scientifically shaken by a group of British scientists. They shook the handkerchiefs mechanically and by hand. "Gentle manipulation" of a used, dry handkerchief will distribute an average of 15,000 particles and as many as 50,000, they found.

Even more alarming was the discovery that common aerial disinfectants do not kill these germs.

The handkerchief experiments were made at Harvard Hospital, Salisbury, and are reported in the British journal, *THE LANCET* (July 31), by K. R. Dumbell, J. E. Lovelock and E. J. Lowbury.

In the experiment, they used cotton handkerchiefs which had been issued to volunteers and used two days. The handkerchiefs were shaken in a special room with an air blower. The air blower proved to be five times as effective as hand-shaking of the handkerchiefs.

When the scientists discovered the huge particle count, they tested the germs with the "best available" aerial disinfectants. Three chemicals and ultraviolet rays all failed to kill the germs under normal conditions.

Using your handkerchief, the scientists conclude, is probably the most important single method of spreading germs, with the possible exception of bed-making. Talking and nose-blowing, they add, probably contribute few germ particles.

The real villain is your handkerchief.

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MEDICINE

Cure for Abscesses

➤ A PAINLESS CURE for abscesses which leaves no scars is reported by Dr. Harry J. Cohen of New York in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Aug. 21).

Pus is drawn from the abscess with a large needle to which a syringe is attached and replaced with approximately the same amount of penicillin solution. No bandages are required.

This procedure was first tried on a newborn infant with abscesses covering the entire back, buttocks, abdomen, thighs and legs treated at the Harlem Hospital. The child had a fever, and abscesses continued to form after 11 days of treatment with sulfonamide drugs. The accepted procedure of puncturing the abscesses to allow drainage was impractical because the whole body was involved which would create a problem with dressings and nursing care.

First, 10,000 units of penicillin were injected into the muscles every three hours until the child's temperature returned to normal, after two days. Then each abscess that had become soft was treated by replacing the pus with penicillin. One such treatment was sufficient to heal the abscess. In three weeks the infant was entirely well with no scarring of the body.

Fifteen other children with abscesses of various parts of the body were cured by this method, Dr. Cohen states.

Advantages of the new treatment to the pediatrician, Dr. Cohen points out, are: treatment can be given in the office or

home; anesthesia is unnecessary as it is painless; it eliminates the need of dressings which are difficult to keep in place and, depending on the site of the wound, difficult to keep from getting contaminated by body wastes; it facilitates nursing care; and it prevents scar formation which is important when the infection is on the face or neck.

This treatment has been used in other conditions marked by infected cavities, including acute osteomyelitis, inflammation of the bone.

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BIOCHEMISTRY

Ultraviolet Rays Hinder Food Production in Fungi

➤ ONE-CELLED green plants were deprived of their power to make their own food by irradiation with short-wave ultraviolet, in experiments performed at Yale University by Edwin A. Davis. Strains of their offspring showed themselves permanently handicapped in this way; they could survive and reproduce only when supplied with ready-prepared foods, practically as if they were fungi. As the supply of glucose was depleted they lost their color, but regained it when fresh glucose was added.

There is a certain irony in the plight of this microscopic green plant that is unable to use its chlorophyll in the natural way, for its botanical name is *Chlorella*, which

translates as "little green one."

Although Mr. Davis' study was conducted solely with an eye to learning more about the biochemistry of chlorophyll and its action, there is a possible point of interest in it for students of plant evolution. It has long been supposed that fungi, which must find their food ready made, were once self-supporting algae, properly equipped with chlorophyll. This study gives a hint of how the shift from green independence to pallid dependence may have started.

Mr. Davis' results are reported in the journal, *SCIENCE* (July 30).

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WILDLIFE

Expedition Will Study Strange Animals and Birds

➤ THE HIGHLAND FLOWER MOUSE, somersault-turning ratel, white-faced wagtail and the blue-bearded bee eater are not characters out of fairy stories. They are animals and birds that really exist in the little-known kingdom of Nepal which lies between India and Tibet and will be investigated by an expedition sponsored by the National Geographic Society, Yale University and the Smithsonian Institution.

The highland flower mouse is a sort of rodent, somewhat like a rat, which lives in grass nests in the hollows of decayed trees. The somersault-turning ratel is also called the honey badger. It is a form of mammal related to the bear. Both the white-faced wagtail and the blue-bearded bee eater are birds.

Nepal has been known chiefly as the source of the British Empire's fighting Gurkas and as a famous hunting region. A great variety of animals live in its high grass and jungles, including the elephants, tigers, wild oxen and the great one-horned rhinoceros. Only lately has Nepal entered into diplomatic and direct trade relations with the United States. The new Maharaja of Nepal, Sir Mohan Shum Shere Jung Bahadur Rana, has given his personal approval to the expedition.

Dr. Dillon Ripley, Yale University zoologist, will head the expedition which sails from Seattle, Wash., Sept. 15.

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AERONAUTICS

North Pole Is Air Center

► THE NORTH POLE is the center of the world of a strategic air force of the present day, the annual report of the U. S. Air Force indicates. This area extends southward to about 30 degrees north latitude.

This includes all the United States except the southern tip of Florida and a bit of Texas, includes all of Europe, a little of North Africa, and Asia except the nations on the Indian ocean and the South China sea. Japan is within it.

The shortest air route between central United States and the Urals, between Alaska and Germany, or between Greenland and Japan lies directly over the polar region, the report states. Although the polar ice cap is impossible to ships or surface forces, it offers no barrier to aircraft flying above it. The cap of the world from the 30th parallel to the North Pole is the world of air power.

Within this area are eight great industrial areas which are today of sufficient productivity to be significant factors in a full-scale war. These centers are Japan, central Siberia, the Ural Mountains, Moscow, the Don Basin, western Europe, the

British Isles, and northeastern United States. The main targets of military air power in a war are industrial: oil refineries, steel mills, engine factories, electric power plants, aluminum smelters, or whatever may be important to military effort. From them flow the arms and weapons, the fuel and ordnance, and everything necessary to maintain fighting forces.

American national defense can not rely solely on interceptor fighters and anti-aircraft ground installations to defend approaches from the Arctic. It must include, the report asserts, craft that can answer aerial aggression with a smashing retaliatory attack. America must have aircraft that can operate effectively under the climatic conditions of the Far North.

There also must be available to that defense force a system that will warn of an approaching attack in time to take counter measures. It would include adequate intelligence with early warning radar devices. Then there must be a long-range striking force with aircraft that can make non-stop round trips from American bases across the polar route to an enemy's industrial installations and back to their stations.

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MINERALOGY

Sufficient Liquid Fuels

► FUEL OIL for home and other heating, and gasoline for cars and power, will probably be sufficient to meet all essential needs during the coming winter months providing reasonable precautions are taken to use wisely the available supply.

The oil industry today is refining 111 gallons of crude oil for every 100 gallons it processed a year ago. This means an 11% increase in supply. The total processed each day at the present time is more than 237,000,000 gallons. Demands, however, have increased during the year. There are now more home oil-heaters, farm tractors, motor vehicles, diesel engines and diesel locomotives than ever before in the history of liquid fuels.

The reasonable precautions that can be taken by the ordinary car owner and home owner are concerned mostly with keeping the mechanical equipment in which the liquid fuels are used in good condition.

This means for the automobile, properly adjusted carburetors and ignition, clean spark plugs and tire inflation. It means also avoiding unnecessary driving, "jack rabbit" starts, high speeds, engine racing, and running engines while parked.

In the home, it means having the oil heater serviced by an expert to see that it is in proper condition for efficient functioning. At the same time, the building itself should be checked so that the heat gener-

ated by the furnace is not wasted into the great outdoors. Window stripping, storm windows and doors, and wall insulation save heat. Cracks and crevices are excellent "heat exchangers" and, in the interest of liquid fuel saving, should be closed before the furnace is put into use.

For the most of the United States, the oil industry is of the opinion that sufficient liquid fuels will be available to meet essential needs unless military demands greatly increase. There may be some tight spots and temporary shortages, but not of serious proportions, it states in a recent report by the Oil Industry Information Committee of New York. Shortages are more apt to occur in the Middle West, the report indicates, because much must be brought into that region by tank cars. Pipeline distribution to this area has been handicapped by a shortage of materials, including steel.

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WILDLIFE

Find African Big Game No Longer Run in Herds

► ELEPHANTS and other big game animals in Africa no longer seem to run in big herds.

This is the conclusion of Dr. James L.

Clark of the American Museum of Natural History in New York. Dr. Clark was leader of the Museum's Central African Expedition which has just returned to this country.

He said that big game seems to be fairly plentiful. But the animals are not found in herds as they once were, except in the game preserves and national parks in Africa.

The expedition was more interested in insects than big game, but it found some giants of the insect world. Huge termite queens, four inches long, are among the specimens brought back by Dr. Neal A. Weber, associate professor of zoology at Swarthmore College and a member of the expedition.

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PUBLIC HEALTH

Girls Born Today Have Life Expectancy of 70

► WHITE GIRLS born today can expect to live to be 70; boys to reach the age of 65.

This new high of 67 years as the average life expectancy for people in the United States was reached in 1946, latest year for which complete figures are available, reports the National Office of Vital Statistics of the Public Health Service. Preliminary figures for 1948 indicate that the average length of life today is about the same or just slightly lower than it was two years ago.

A baby born today can be expected to live almost a whole year longer than if he or she had been born in 1945, and nearly two years more than if born in the prewar years of 1939-41. The life expectancy of babies today is over 17 years longer than that prevailing at the turn of the century.

The number of years left to a child of 10 today depends both upon sex and race. White boys on the average will live another 58.3 years, white girls another 63 years. Non-white children usually do not live as long, boys averaging another 51.9 years, girls another 54.8 years more.

Young men of 20, if white, have an average remaining lifetime of 49 years, girls one of 53.4 years. Males of 40 may expect to enjoy about another 30.9 years of life, females another 34.8 years. White men of 60 on the whole have 15.6 years more to life, women of the same age 18.1 years more.

But for people reaching the age of 65, non-whites have a longer average lifetime left than whites. At 65 and 70, this difference amounts to but a few weeks or months. But for people who reach 75, it adds up to a year or so.

White men of 75 may expect to live another 7.7 years, white women another 8.6 years; non-white men on the average have left to them the same number of years as white women, and non-white women may expect another 10.5 years of life.

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Books of the Week

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ADVANCES IN BIOLOGICAL AND MEDICAL PHYSICS, VOLUME I—John H. Lawrence and Joseph G. Hamilton, Eds.—*Academic Press*, 484 p., illus., \$8.60. Discussing the use of radioisotopes in medical research and the protection of workers and others against injury from radioactive materials and the atomic bomb.

FIRST LOVE—Joseph Greene and Elizabeth Abell, Eds.—*Bantam*, 242 p., paper, 25 cents. A collection of stories by well-known authors. A book for young people wondering what first love is like and for their elders who like to be reminded. The tales seem to say, as the editors comment "that there might be clearer, straighter, less chancy ways of first encounter."

FLAK BAIT: The Story of the Men Who Flew the Martin Marauders—Devon Francis—*Duell*, 331 p., illus., \$5.00. "Flak Bait," was the name of a bomber which flew 202 combat missions and was hit by flak 1,000 times. But it was also a symbol.

THE INSECT GUIDE: Orders and Major Families of North American Insects—Ralph B. Swain—*Doubleday*, 261 p., illus., \$3.00. An authoritative work, beautifully illustrated in black and white and full color by SuZan Swain.

AN INTRODUCTORY COURSE IN COLLEGE PHYSICS—Newton Henry Black—*Macmillan*, 3d ed., 800 p., illus., \$5.00. Preserving the historical order with simple machines treated in the first chapter; atomic fission in the last.

JOHN GOFFE'S MILL—George Woodbury—*Norton*, 245 p., \$3.00. The delightfully written account of how a "reformed professor," anthropologist of a museum, rebuilds his inherited mill and its industry along with his own life.

NATURAL SCIENCE THROUGH THE SEASONS: 100 Teaching Units—J. A. Partridge—*Macmillan*, 520 p., illus., \$3.00. A text for all grades from one to eight which contains lots of practical "how-to-do-its" and experimental material. By a Canadian author.

NATURWISSENSCHAFTLICHE RUNDSCHAU, VOLUME 1, NUMBER 1—H. W. Frickhinger, Ed.—*Wissenschaftliche Verlagsgesellschaft*, 48 p., illus., quarterly, 6 DM per year, 2 DM per copy. A new magazine devoted to scientific news.

PRINCIPLES FOR PUBLIC ACTION ON PROBLEM DRINKING: A Guide to Model Legislation—*Research Council on Problems of Alcohol*, 16 p., paper, 15 cents.

THE STARS ARE YOURS—James Sayre Pickering—*Macmillan*, 264 p., illus., \$3.95. A book for laymen introducing our nightly companions in the heavens.

A TEXTBOOK OF HISTOLOGY—Alexander A. Maximow and William Bloom—*Saunders*, 5th ed., 700 p., illus., \$8.50. A well-known text revised and with new illustrations.

THE TREES ALAMOS SITE ON THE SAN PEDRO RIVER, SOUTHEASTERN ARIZONA—Carr Tut-till—*Amerind Foundation*, 88 p., 36 pl., paper, free to universities and graduate anthropologists on request direct to Amerind Foundation, Dragoon, Ariz.

WOOL WAX—D. T. C. Gillespie—*Hobart Pub-*

lishing Co., 94 p., paper, \$5.00. Reporting research at the Australian Council for Scientific and Industrial Research on the uses and derivatives of this byproduct of the wool industry.

Science News Letter, August 28, 1948

PSYCHOLOGY

Ant Is Made Neurotic By Frustration

➤ ANTS, like their larger four-legged and two-legged kindred, may "get the jitters" if they run into a situation that is too much for them. The story of such a neurotic ant is told in the journal, *NATURE* (July 10), by Dr. Derek W. Morley of the Institute of Animal Genetics in Edinburgh.

Dr. Morley maintains a colony of ants in his laboratory. To test their intelligence he puts them through a maze, similar to the larger apparatus used with rats and other mammals.

One time he put one of the most intelligent of his ants back into the maze within five minutes after she had successfully completed a run through it. This time she lost her way and presently was in a dead-end alley.

Instead of immediately retracing her steps and trying to find the right path, the ant remained at the dead end, feeling around the three walls and showing continually rising excitement. Especially noticeable symptoms were jerkiness in movements of legs and antennae.

Finally she faced the other way, but seemed to have lost control of herself. With her legs still jerking, she staggered around backwards in a circle.

Dr. Morley rescued her, ran cold water over her for a few seconds, and then put her back into the nest, where she soon recovered and ran around normally.

Science News Letter, August 28, 1948

ENGINEERING

Use Surplus Gas Turbines For Coal-Burning Tests

➤ TWO AMERICAN gas turbine engines, one of which was once destined for Russia under the lend-lease program, are now to be used in this country in conducting two notable experiments in the coal-burning field.

The first is in connection with the use of pulverized coal as a fuel for gas turbine locomotives. The second is in the use of gases for fuel which are obtained by burning underground thin layers of coal just as they occur in nature.

These two gas turbines now belong to the U. S. Bureau of Mines. They were obtained from the War Assets Administration

after being declared surplus by the State Department. The one which was to be shipped to the Soviet Union is a 40,000-cubic-feet-per-minute unit. The other is a 23,000 c.f.m. turbine, and it is this one which will be used with the underground burning of coal experiment.

The gas turbine engine, now becoming more popular in America and other countries because of its efficiency, is similar to the steam turbine but utilizes gases of combustion under high pressure against the vanes on the shaft of the engine to cause its rotation. High-pressure steam is used in the steam turbine. One great advantage of the gas turbine is that it requires no water. Therefore it can be used where water is scarce, in desert country and in mines, and it can be used in locomotives.

The larger of these two units is to be located at Dunkirk, N. Y., in a laboratory of the Locomotive Development Committee of the Bituminous Coal Institute. Scientists of the organization, working at Baltimore and using funds provided by a group of American railroads, have already successfully used pulverized coal as fuel to operate a gas turbine. Two locomotives are now under construction which will be powered by coal-burning gas turbines. The use of this turbine will further the studies of the scientists.

The experiment in burning bituminous coal as it occurs in underground seams is being conducted at Gorgas, Ala., by the U. S. Bureau of Mines and the Alabama Power Company in collaboration this year for the second time. Holes are drilled down through the coal seam, and an incendiary is dropped into one. Constant air pressure is then applied to support combustion. Gases formed are recovered from the other drill holes. They are suitable for firing a furnace or can be used to make synthetic liquid fuels.

Science News Letter, August 28, 1948

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• New Machines and Gadgets •

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⚙️ **UNIVERSAL TELEVISION** receiver operates on alternating current of any frequency and on direct current as well, eliminating the need of special converters in DC areas. The new receiver is a table model with a seven-inch direct-view video screen, containing 17 television tubes plus one rectifier tube.

Science News Letter, August 28, 1948

⚙️ **ASBESTOS-BASED TAPE**, for electrical insulation, has high insulating strength and is suitable for use where high temperatures are encountered. The non-inflammable paper-like tape can be brought to bright red heat in a Bunsen burner without igniting or melting and, in use, is unaffected by high temperatures for long periods.

Science News Letter, August 28, 1948

⚙️ **COPY-ROLL** kit is a new photo-copying unit with complete processing facilities and tiny self-contained dark room compactly arranged in a carrying case of suitcase size. It will produce letter- and legal-size photo-exact facsimiles of anything written, typed, printed, drawn or photographed in a matter of minutes.

Science News Letter, August 28, 1948



⚙️ **INFLATABLE DRESS FORM**, for the home dressmaker, can be made to take the shape of an individual by a little padding here and there, a tape around the waist, and perhaps the person's own brassiere on the bust. The plastic form, shown in the

picture with a net-jersey cover to hold pins, may be deflated for storage.

Science News Letter, August 28, 1948

⚙️ **DRAWING AID** for engineers and draftsmen is a square plate of cellulose nitrate plastic with cut-out circles which makes it possible to draw accurately standard bolts, nuts, hex head cap screws and similar machine parts without the use of a compass.

Science News Letter, August 28, 1948

⚙️ **SOLID TIRE** for factory-truck use is made of rubber with a soft inner section to provide greater cushioning effects. Its tough, long-wearing rubber tread, that resists cutting and chipping, together with the soft center, permits the truck to pass safely over obstacles with little jar to the load.

Science News Letter, August 28, 1948

⚙️ **CONVERTIBLE CRIB** for the infant becomes a chair, with back and foot-rest, and a table for toys when the sleeping pad is removed and the sectional bottom dropped. Casters under the four legs on the non-tipping device permit it to be rolled from room to room.

Science News Letter, August 28, 1948

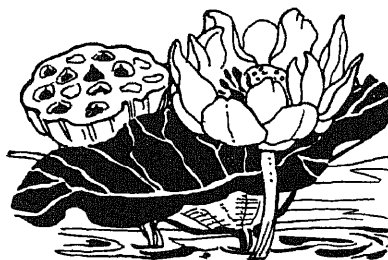
• Nature Ramblings by Frank Thone •

➤ **CIVILIZATION**, we are told, first came into existence in the valleys of great rivers—the Nile, Tigris-Euphrates, the Indus, the Yangtze. Even now, our great cities are built by the waterside—New York, Chicago, New Orleans, Buenos Aires, London, Paris, Rome, Alexandria, Calcutta, Shanghai.

Yet only one of man's major crop plants, rice, is a wet-land plant. All our other cereals, all our principal root crops, most of our vegetables and all our fruit trees demand well-drained soils. Some of them, like barley, will even tolerate a considerable degree of drought. One other extensive culture area, Polynesia, depended on the mud-loving taro for its favorite food, poi; but this region is mostly made up of small islands, supporting a relatively small population. A variety of taro, the dasheen, has been introduced into our own South, but has not yet become a major crop.

Yet there are millions of wet acres, even in the world's most crowded and hungriest lands, that are not exploited for food, at

Wasting Wet Acres



least directly. They produce starchy-rooted plants like cattail, lotus, waterlily and arrowleaf. It would seem at first glance that this stored starch might be made use of industrially if not for food, but no great success seems to have attended experimental efforts in that direction so far.

The only answer that man seems to have devised to the challenge of these deeply fertile but too-wet lands is to drain them

and then plant his conventional upland crops. There is no question that newly drained muckland produces bounteous and profitable harvest, at least in the beginning. But the soils are exceedingly light and friable, so that a relatively short course of cultivation wastes them away. A decade of such farming can destroy the muck that has been centuries in the making. Worse still, such soils are often so full of decomposed vegetable matter that they take fire and burn to ash, right down to the lowered water-table.

It would seem to behoove those who concern themselves with long-range planning for land use to think of ways in which wet or submerged lands can be induced to yield food for man's crowding millions without having to undertake, first the heavy expense of draining, then the risk of quick destruction of the soil's too-rashly exposed riches.

Science News Letter, August 28, 1948

A black and white photograph of a person, likely a nun, wearing a dark, hooded garment with a large, ornate cross on the chest. The person is standing in front of a wall covered in religious murals or tapestries. The image is grainy and has a high-contrast, almost stencil-like quality.

See Page 154

Lincoln Library

Imperial 1 1/2" x 1 1/2" x 1 1/2" 1/2" x 1 1/2" x 1 1/2"

VOL. 54 NO. 10.

MEDICINE

Find New Clotting Factor

Fifth substance necessary to produce clotting has been found in blood. It is a protein which has already been successful against a rare bleeding disease.

► A NEW PROTEIN which plays an important role in clotting has been discovered in blood.

The new blood-clotting factor was described to the International Society of Hematology meeting in Buffalo, N. Y., by scientists from this country and Norway.

Dr. Paul A. Owren of the University of Oslo, Norway, reported that he found the protein in 1944. He called it the fifth coagulation factor. Working independently last year, American scientists located the clotting factor and termed it ac-globulin. The "ac" is for accelerator, because it is one of the triggers that sets in motion the clotting process.

Four previously known substances are all necessary to produce clotting in blood. Prothrombin, a blood protein, must be activated by thromboplastin, a substance present in tissues, and calcium to form thrombin. Thrombin is the intermediate substance that acts on fibrinogen, the fourth factor necessary in coagulation to form the blood clot.

How ac-globulin, the new fifth blood-clotting factor, helps produce prothrombin was explained by Drs. Walter H. Seegers and Arnold G. Ware of the Wayne University College of Medicine, Detroit.

Their work has been aimed at isolating the new factor in pure form in a laboratory

test tube. Although it is difficult to separate, they said that they are very near to getting the substance in purified form.

The Norwegian scientist who first discovered the new protein reported that he has successfully treated one patient with it.

Dr. Owren said the patient came to his hospital clinic with a very rare bleeding disease which the Norwegian doctor calls parahemophilia. After treatment with this new clotting factor, supplied from normal human plasma, the patient was relieved of her bleeding tendency.

Because the disease is so rare, physicians here said that at present they have no way of knowing how often it might occur. Only a few cases have been reported in the U. S.

Usefulness of the new factor in dicumarol treatment was investigated by Dr. John H. Olwin of the University of Illinois College of Medicine, Chicago.

Dicumarol is the anti-blood-clotting drug that comes from spoiled sweet clover. It is used for treatment of certain heart conditions where there is a tendency for the blood to clot in the veins.

Dr. Olwin said that ac-globulin appeared to have only minor importance in this type of treatment. But he described a new two-stage method which he has developed for safer handling of patients on dicumarol.

Science News Letter, September 4, 1948

MEDICINE

Infantile Blood System

The atomic bomb will reduce your blood-forming system to an embryonic state in first few months after radiation exposure, study indicates.

► THE ATOMIC BOMB will make a baby of you, not through fear alone but by its effect on your blood-forming system, the International Society of Hematology was told in Buffalo.

This picture of how a lethal dose of radiation will convert your blood system to an embryonic state was presented by Col. Elbert DeCoursey of Brooke General Hospital, San Antonio, Texas.

Col. DeCoursey made his study from material he picked up at Nagasaki and Hiroshima while a member of the Joint Commission for the Study of the Effects of the Atomic Bomb.

From this he made the unexpected discovery that when the cells in the bone marrow attempt to regenerate after killing

doses of radiation, they make plasma cells. These cells are of the same type as the cancerous lesions in multiple myelomas.

Col. DeCoursey described the blood picture as follows:

Lymphocytes, white blood cells from lymph glands, decreased within 48 hours, reaching their lowest peak after four weeks. They returned to normal in 12 weeks in the patients who lived.

Granulocytes, white blood cells from bone marrow, also decreased within 48 hours, reaching their lowest number within four weeks, but they returned to normal within eight to nine weeks.

Red blood cells decreased drastically some time during the first week, reaching the lowest point within six to eight weeks.

They took the longest time to get back to normal—14 weeks.

In the first stage then, the blood cells which usually formed in the bone marrow disappeared. However, some radiation-resistant cells, called histoblasts, remained. These are the young cells, originators of all the cells that are found in the blood.

These multiply and within eight weeks the whole bone marrow becomes filled with young blood cells. However, there is a catch to this happy state of affairs. The cells don't grow up but remain in their baby state.

At this point transfusions are needed to tide the patient over into the third month when the blood-forming system reasserts itself and cells begin to mature.

Science News Letter, September 4, 1948

PUBLIC HEALTH

Proportion of Babies Born In Hospitals Increases

► A LARGER PROPORTION of new babies in 1946 were born in hospitals than ever before, figures compiled by the National Bureau of Vital Statistics revealed.

From 1935 to 1946 the number of hospital births jumped from 36.9% to 82.4% of the total births. In 1935, 50.6% of the registered live births were attended outside hospitals by doctors, and 12.5% were attended by mid-wives and others. In 1946, only 12.2% of births were handled outside hospitals by doctors. Only 5.4% were attended by persons outside the medical profession.

While almost all the white births were attended by physicians, for non-white births less than two out of three had physicians present and slightly less than half occurred in hospitals.

There was also a difference between births in urban areas and in rural areas. For city dwellers 92.5% of the registered live births took place in hospitals, compared with 67.1% for country dwellers.

Science News Letter, September 4, 1948

ELECTRONICS

Flawless Glass Produced By Electric Heating

► FLAWLESS GLASS by an electrical heating process is now being produced, using electrical equipment developed by General Electric, it was revealed. The electric current, passed through the glass, is converted into heat by the resistance of the material much as it is in the heating element in ordinary heaters.

Glass melting with electricity has been practiced in Europe for a number of years, but the product frequently was discolored or contained air bubbles. With the new American process these faults do not result and the product is glass of the highest quality. When the glass is melted, it can be poured and molded into desired shapes.

Science News Letter, September 4, 1948

BIOCHEMISTRY

Proteins Make Vitamins

Experiments with rats revealed that proteins are increased when they are set free from vitamin-building. Discovery may aid in disease-fighting.

► THE BODY may be able to manufacture some vitamins from proteins if it does not get enough vitamins from food, the International Society of Hematology was told in Buffalo.

Discovery that some vitamins can be made from proteins was made in experiments with rats, but the findings may apply to humans, Dr. Floyd S. Daft of the National Institutes of Health, Bethesda, Md., declared.

Dr. Daft found that if there are not enough vitamins and amino acids, chemical building blocks of proteins, in the diet of rats, they develop blood disorders. The nutritional anemia may be caused by a shortage of protein material to manufacture the missing vitamins, Dr. Daft suggested.

Rat experiments indicated that a diet slightly deficient in tryptophane, an amino acid, produced a shortage of the vitamin, folic acid. When the rats were treated with either of two vitamins, niacin or folic acid, they recovered from the anemia.

When the vitamin was given the rats, Dr. Daft said, it seemed to increase the supply of protein, because the protein was no longer used in vitamin-building.

Rats put on a diet in which casein, the principal protein in milk, was the only protein, showed growth failure and frequently developed blood disorders. Adding three protein-building amino acids to the diet prevented this condition from developing.

But after the blood condition had developed, one or more other substances such as amino acids, folic acid or purified liver extract were generally needed.

Thus, Dr. Daft concluded, vitamins can help correct a protein deficiency, while proteins will aid in building up the supply of vitamins.

If a diet is low in protein, there will develop shortages of both vitamins and nucleic acids, the basic substance in the nucleus of a cell.

The findings with rats may apply to humans, Dr. Daft said, because both rats and humans respond to the same treatments with vitamins for certain types of anemia. Folic acid and the new vitamin, B-12, correct these anemias in both, it was found.

How sulfa drugs work in the body may be explained further by discovery of this interchange between vitamins and proteins, the scientist indicated. Dr. Daft previously found that sulfa drugs cause anemia and destruction of white blood cells in rats. His new experiments have led him to believe

that sulfa drugs may create an amino acid shortage in the body.

Science News Letter, September 4, 1948

New Hereditary Disease

► A NEW hereditary bleeding disease which strikes infants was reported to the society by two French doctors, Jean Bernard and J. P. Soulier, both of Paris.

Hemorrhages began in 15-day-old babies. In some cases two or three children in the same family were affected. Blood vessels under the skin and the membranes lining the body organs hemorrhaged, and one of the infant victims vomited blood.

Science News Letter, September 4, 1948

PSYCHOLOGY

Fourth of Veterans Found Mistaken in Job Choice

► ONE of every four veterans who came to a vocational guidance center was found to have mistaken ideas about what sort of job he should try to get, a survey has revealed.

Some of them aimed too high for their intelligence or abilities. Some had school

records which did not justify the choice they made. Others were handicapped by personality maladjustments, physical disabilities or lack of money to finance their training.

A study of the job choices of 224 veterans is described by Joseph Stubbins of Columbia University in the journal, OCCUPATIONS (April).

Six of every ten veterans made appropriate choices, while approximately one in every ten was unable to suggest a suitable job for himself.

Only 3.6% of the group aimed too low in their vocational choices.

The more educated veterans did a better job of selecting an occupation, it was discovered. Pensioned veterans made reliable choices. Those who came for guidance voluntarily needed more help, because they tended to make less realistic choices.

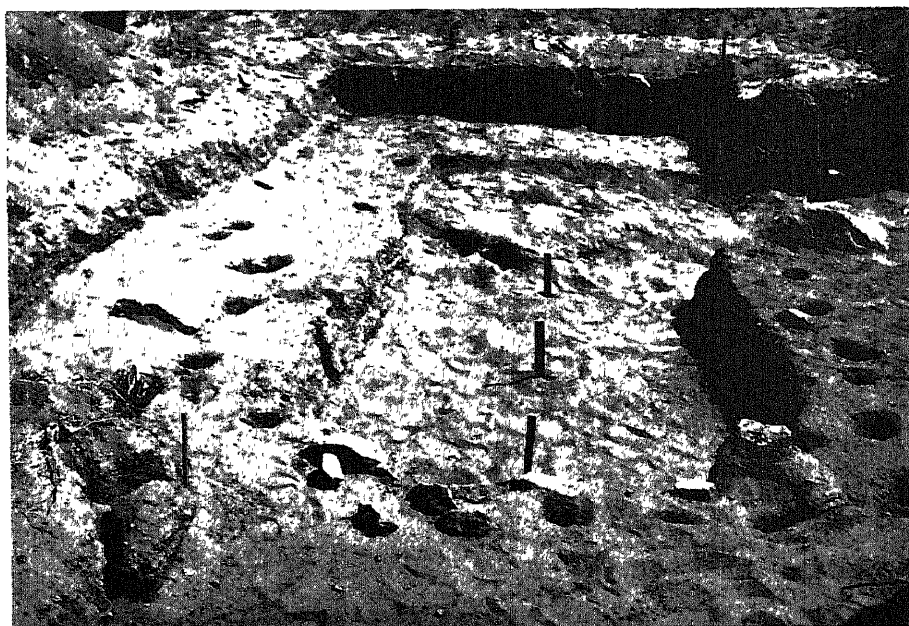
Science News Letter, September 4, 1948

ARCHAEOLOGY

Earliest American House May Have Been Found

► AMERICA'S OLDEST HOUSE, with a possible age ranging from 10,000 down to 3,000 years, may be represented by an enclosing rectangle of post-holes discovered near Little Lake in Inyo County, Calif., by an expedition from the Southwest Museum in Los Angeles. Actual find was made by a volunteer amateur archaeologist, B. E. McGown of San Diego.

There are 23 holes, averaging four inches in diameter, outlining what seems to have been a crude hut about eight by 12 feet in



AMERICA'S OLDEST HOUSE—These post-holes discovered near Little Lake in Inyo County, Calif., may date anywhere from 10,000 years to 3,000 years ago.

Imperial Agricultural Experiment Station

size. The posts stood upright, so it is assumed that they supported a roof. No hearth has been found in the enclosure, but near the southwest corner is a depression containing many charred and split bones of food animals. The floor was of packed earth.

M. R. Harrington, curator of the Southwest Museum, who was in charge of the expedition, states that the dwelling may date from shortly after the close of the Ice Age. Stone spear or dart heads of the type recently named Pinto Basin culture were found in and near the old house site, so there is no doubt that Pinto Basin man built and lived in the hut.

Date of the Pinto Basin culture, first discovered near Twentynine Palms, Calif., by Mr. and Mrs. W. H. Campbell, has not yet been established. Estimates range from

as recent as 1,000 B. C. to as ancient as 8,000 B. C.

Earliest American habitations, aside from caves, are pit dwellings dating from the earlier centuries of the Christian era, when the Basketmaker culture flourished in the Southwest.

Science News Letter, September 4, 1948

GENERAL SCIENCE

SNL on News Stands Of New York City

➤ WHEN YOU ARE in New York City you may now buy the SCIENCE NEWS LETTER each week on many of the news stands of the metropolitan area. Look for it and tell your New York friends about it.

Science News Letter, September 4, 1948

Letters To The Editor

Biggest Ever

Your item (SNL, Aug. 21) about big hailstones reminds me of some in Cincinnati, Ohio, about 1900. Major Bixby (afterwards Chief of Engineers, U. S. Army) stared at them in astonishment, called a cab, then took off his coat and bundled up the biggest ones in it. These he rushed to an engineer friend at the cold-storage plant to be preserved as proof of his veracity. But his friend was a practical joker and found a way to make them grow to immense size (a little bigger at each call). So they, probably, were the biggest ever.—Gilbert S. Walker, Pittsburgh.

Reader's Page

I read your magazine and I think it is wonderful! It should be in all schools to promote science and American ingenu-

ity. Why not devote a page in your SCIENCE NEWS LETTER for the readers to write and discuss their amateurish ideas and inventions? Thanks.—J. S. Badon, Breau Bridge, La. *Here's the page right here.*

Laws of Matter Up-to-Date

This compilation (SNL, June 19) is one of the clearest condensations that I have ever read. I am filing it for future reference.—M. L. Ballou, Arlington, Va.

Televised Ocean Bottom?

It would be a good idea if the Woods Hole Oceanographic Institution would use television on its vessel "Atlantis" to see what is at the bottom of the sea (SNL, Aug. 14)—R. Youngblood, New York City.

Question Box

ARCHAEOLOGY

Where may America's oldest house be located? p. 147

ASTRONOMY

What are white dwarfs and why were they named so? p. 150

What is the latest theory on the birth of cosmic rays? p. 156

BIOCHEMISTRY

How may the body act to correct a vitamin deficiency? p. 147

MEDICINE

How do the two new artificial kidneys

operate? p. 157

How was the Rh factor served as a clue to the origin of the Basques? p. 149.

How many factors are now believed to be involved in clotting? p. 146

What effect will the atomic bomb have on your blood-forming system? p. 146

What "granddaddy" virus may have been found? p. 151

RADIO-PHYSICS

Where does "cosmic noise" come from? p. 155

Photographs: Cover, p. 154, p. 155, University of California African Expedition; p. 147, M. R. Harrington, Southwest Museum; p. 149, The Kellogg Corp.; p. 151, Gulf Oil.

INVENTION

Salt in Auto Tire Helps Prevent Skidding on Ice

➤ SALT in an automobile tire is the newest aid suggested for driving on icy streets.

The salt is not just added to the tire. It is scattered within a new material developed for recapping worn tires. The material, developed by the United States Rubber Company, is called "Wintrac."

This new recapping material consists of a high quality tread stock into which thousands of pieces of rock salt have been mixed. As the tread wears down, the pieces of salt are released to form surface pores which grip the road.

Science News Letter, September 4, 1948

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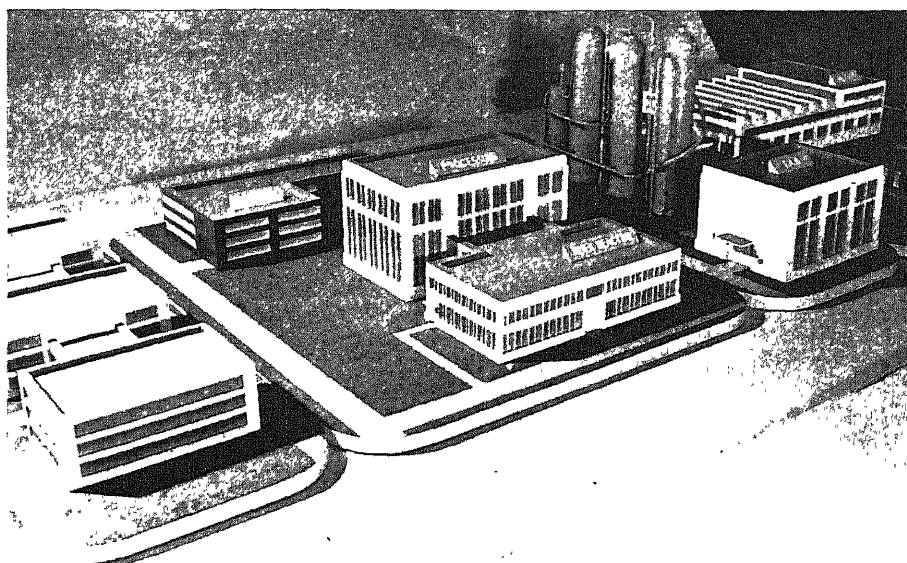
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NUCLEAR ENERGY PLANT—This is a preview around which industrial life is expected to center in the closing part of the Twentieth Century. In the foreground is a pile building with processing structure behind it and Power Unit at the rear. It was displayed by The Kellogg Corporation at the Atomic Energy Exhibit in New York.

MEDICINE

Rh Factor Clue To Race

Basques are believed to be an almost pure representative race of ancient Europe. Discovery that they are predominantly Rh negative supports this theory.

➤ TWO MYSTERIES of science may have been partly solved by a blood study of Europe's most puzzling people, the Basques of northern Spain, evidence presented to the International Society of Hematology, meeting in Buffalo, indicated.

The mysteries are:

1. Where did the Basques, who have a strange language and culture, come from?
2. Will European races continue to have "incompatible" Rh positive and Rh negative blood?

Basques may be the purest descendants of a race that lived in Europe before the invasion of the Mongoloid hordes from Asia. Blood study of 400 Basques has revealed that they are nearly a pure Rh negative group, Drs. A. E. Mourant, Elizabeth W. Ikin and J. M. Chalmer of the Lister Institute, London, told the Society. Their study was based on work done by Prof. J. B. S. Haldane of England and Dr. A. S. Wiener, New York.

European racial groups have an estimated mixture of 60% Rh positive genes and 40% Rh negative. This division is believed to have occurred when Rh negative European peoples were invaded from Asia by an Rh positive race. Thus, the Rh negative Basques have probably inhabited

Europe longer than the mixed or positive Rh peoples.

The Rh factor is involved in a disease producing hereditary anemia in the newborn. Incompatibility of the blood groups between an Rh negative mother and an Rh positive father produces an Rh positive baby. Just as antibodies form in the blood to kill disease germs, so the mother's antibodies injure the blood cells of the baby, often resulting in death.

This Rh complication is likely to continue in European races, the British scientists predicted. Neither the Rh positive nor the Rh negative genes have been wiped out in more than 10,000 years of mixing, their studies indicated.

Over a much longer period of time and by a very slow process, they theorized, it is possible that the rare Rh negative may some time disappear.

The Basques are a group of some 800,000 people living in the region of the western Pyrenees mountains, which form the boundary between Spain and France. Scientists have been unable to explain the origin of this distinctive and rather secluded group. It has been suggested that the mystery of the origin of the Basques might never be solved.

Now, it appears that modern discoveries about human blood may offer some clues concerning the Basques which the people and their unique culture have not been able to provide.

Science News Letter, September 4, 1948

ICHTHYOLOGY

40,000 Kinds of Fish Are Known to Exist

➤ ALMOST ANY "fish story" may be true, because there are more than 40,000 different kinds of fishes in the world.

Fishes, from the Philippine goby, which is less than a third of an inch long and weighs less than a hundredth of an ounce, to the whale shark, specimens of which weigh more than 20 tons, are described by Dr. Leonard P. Schultz, Smithsonian Institution curator of fishes, and Mrs. Edith M. Stern in the new book, *THE WAYS OF FISHES*.

There are more fishes than any other backboneed animals in existence, and more varieties of fishes than all varieties of mammals, birds, reptiles, or amphibians.

"Not all," says Dr. Schultz, "are creatures that can exist only in water and move only by swimming. Some walk, some fly, some breathe air, some water."

"There are fishes with eyes divided somewhat like the bifocal lenses of spectacles—the upper part for vision in air, the lower for vision in water. There are fishes that burrow like moles, hibernate like bears, fight like tigers."

"Some are placid, others nervous and easily irritated. Among them are the timid and fearless, the lazy and energetic, the mild and bloodthirsty."

There are many poisonous fishes but they are not aggressive and only use their poison in self defense. The stingray, a close relative of the sharks, is one of the most poisonous. Some of these weigh nearly half a ton and have poison barbs more than a foot long.

Most bloodthirsty fish is the piranha of the Amazon and Orinoco. They are quite capable of nipping a finger or toe off a swimmer with their teeth like the blades of pruning shears.

The largest sharks are entirely harmless, but the great white shark and the hammerhead are extremely dangerous when they are excited by blood. They have a blood-curdling habit of slowly cruising around their victim a few times before suddenly going at him.

Some fish hibernate in ice. Since a freshwater fish freezes at a temperature a little lower than the freezing point of fresh water, the fish can be in a block of ice and still not frozen.

Lungfishes can breathe in air as well as water. Dr. Schultz explains that they may be on their way to evolving into land animals.

Science News Letter, September 4, 1948

GENERAL SCIENCE

Industry Must Disperse

► THE DISPERSION OF INDUSTRY is necessary for and vital to national defense. This is a basic conclusion of the National Security Resources Board. A new urban redevelopment for industrial and population dispersion is also essential.

World War II developed weapons of swift and widespread destruction capable of attacks of unprecedented effectiveness against industrial centers, the NSRB report states. Our previous isolation and security against weapons of destruction are gone. In time, no spot in the Nation will be any less vulnerable than another. There is no military defense against the atomic bomb except space.

While there will continue to be defense against any carrier which a potential enemy might use to deliver such a bomb, this defense alone is not sufficient. The task ahead is to distribute vital facilities over greater land area to reduce attractiveness of targets and increase security of plants and workers.

The National Security Resources Board was created in 1947 to advise the President concerning the coordination of military, industrial and civilian mobilization. Industry's security is bound up in national security. An important phase of the duty of the board is "the strategic relocation of industry."

The report points out that underground installations, although probably providing maximum protection, are not thought practical for application on a large scale. This is also true for special construction of above-ground facilities, employing fire, blast, or radiation-resistant materials. Either of these may be essential and justified in connection with some highly strategic facilities. Dispersion, however, is considered the most practical solution to the problem of strategic location.

Extreme difficulties would have to be overcome in the distribution of industrial plants. Among various factors are sources of supply, fuel and transportation facilities, the distributive pattern of the industry and the location of markets, and the availability of labor. Then the communities set up must have adequate highways, streets, homes, public utilities, schools, hospitals, police and fire protection, water and sewer systems.

Cities of not over 50,000 population are suggested, with communities separated from others by country areas. Communities of this size are also proposed in Britain. It is thought that they would be too small for attack by atomic bomb because of tremendous cost of each bomb.

Science News Letter, September 4, 1948

ASTRONOMY

Hundred White Dwarfs

► DISCOVERY of nine new white dwarf stars, announced by Dr. Willem J. Luyten of the University of Minnesota and Dr. David MacLeish of the Cordoba Observatory in Argentina, have brought the total number of these stars now known to 100.

Probably the strangest, and most interesting objects in the universe, these stars are so dense that a cubic inch of them, if brought down to earth, might weigh anywhere from one to 1,000 tons.

The first of these stars ever discovered had its existence as a star predicted from little erratic shifts in the motion of Sirius, the brightest star in the sky, even before the faint star had itself been seen. It was discovered with the eyes of the law of gravitation before it was first seen with the telescope in 1862. At first it was thought to be just an ordinary dwarf star, 400 times less luminous than the sun.

But in 1915 Dr. Walter S. Adams at Mt. Wilson Observatory discovered that it was white, and therefore intensely hot on its surface, and so small that it was only a little larger than the earth and 35 times smaller than the sun in diameter. This makes it 40,000 times smaller than the sun in bulk (volume), yet within that small space there is packed just as much matter

as there is in the sun itself. This makes the star so dense that one cubic inch would weigh about 2,500 times as much as gold, or nearly one ton. The mystery deepened for all we could see of the star was gas, and hydrogen gas at that, the lightest of all gases.

It was not until a few years later that the late Arthur S. Eddington in England found the solution. We are here dealing with matter-in-the-raw where, under the conditions of extremely high temperatures, perhaps billions of degrees, all the atoms are "stripped" of their protective covering of electrons. This makes the atom so much smaller that it becomes possible to "pack" them much closer, and from pure theory it was now possible to predict that there should exist stars in which one cubic inch might "weigh" over 10,000 tons.

The name "white dwarf" was coined for these stars. They are extremely small, down to perhaps the size of the moon. They are extremely feeble in light, averaging perhaps one ten-thousandth of the light of the sun. Thus they are genuine "dwarfs" in every respect. In addition, they are very hot on their surfaces, shining with a light much whiter than that of the sun, and often even blue in color.

The discovery and explanation of these stars caused a minor revolution in astronomical and physical thinking. It also forged another, and very important, link in the chain of events that led eventually to the atomic bomb.

During the first two decades after the discovery of the first white dwarf progress was slow since in the beginning astronomers did not even know where to look to find more of them. White dwarfs are so extremely faint that they are hard to find.

Of the first hundred, 61 of the white dwarf stars have been found through the work done on the motions of stars at the University of Minnesota, with the active participation of the Steward Observatory of the University of Arizona, under the direction of Dr. E. F. Carpenter and Dr. P. D. Jose, and of the Cordoba Observatory, at Cordoba, Argentina.

Observations made at Cordoba were of especial importance since this observatory is situated in the southern hemisphere. From it can be observed a number of stars which are invisible from the United States. When the problem of where to find opportunities for the observation of these stars arose, the international spirit of cooperation always present in science asserted itself, and Dr. Enrique Gaviola, director of the Cordoba Observatory, offered the use of the facilities of this observatory and took an active part in planning the observations. The same cooperative spirit prevailed under his successor, Dr. Ricardo Platzek. Observations for the discovery of further white dwarfs are still being carried out continuously with the 60-inch reflector of the Cordoba Observatory.

Originally Martin Dartayet was in charge of the telescope, and made most of the observations. Two years ago he was succeeded by Dr. David MacLeish and the present discovery of nine new white dwarfs comes as the result of these observations.

Of the 61 white dwarfs announced at the University of Minnesota, 35 were found on plates taken at Tucson, Ariz., and 26 on plates taken at Cordoba. Among the stars discovered there is one which appears 25,000 times too faint to be seen with the naked eye. From observations with large telescopes it can be proved that the star is between the earth and the moon in size, and so dense that one cubic inch would weigh about 250 tons.

Perhaps the most important among the 100 white dwarfs now known are those which form part of a double star. Only when two stars are so close together that their mutual gravitation makes them revolve around each other can it be determined how much they weigh. Nineteen such double stars have now been discovered, including one where both the stars are white dwarfs—the only system of its kind now known.

Science News Letter, September 4, 1948

Ceylon is a *black-tea* country; it exported over 287,000,000 pounds in 1947.

MEDICINE

Find "Granddaddy" Virus

Believe that a new viral agent that may be a "stem" virus of sleeping sickness has been found. May mean earlier immunization than now possible.

➤ WHAT MAY BE the first "granddaddy" virus, a new encephalitis agent, has been reported by Dr. W. McD. Hammon, University of California epidemiologist.

The scientist says that the new viral agent, known now only as BFS-867, may prove to be a "stem" virus from which the other "sleeping sickness" viruses, such as western equine and St. Louis encephalitis viruses, are descended.

Many virus researchers have long believed, on the basis of the close kinship of many viruses and their ability to mutate, that such progenitor types do exist. However, none has ever been reported before.

Discovery and identification of such viruses would have great implications for the control of many diseases. Presumably vaccination with a "granddaddy" virus of influenza, if one existed, would immunize against "A" and "B" types as well as others which may not now be known.

This would enable scientists to carry out an immunization program much earlier than is now possible. Because "A" type vaccine, for example, does not protect against "B" type, considerable time is lost in identifying the agent responsible for an epidemic before control measures are effected.

Dr. Hammon said that identification of BFS-867 as a "stem" virus of encephalitis is not yet positive; indeed, positive evidence may never be obtained.

However, exhaustive analyses of the agent, obtained from wild bird mites collected in the Bakersfield area, show that it cannot be explained as a simple mixture of encephalitis viruses.

To the astonishment of Dr. Hammon and Dr. W. C. Reeves, leader of the University's field party in the Bakersfield area, BFS-867 in high concentrations showed characteristics of the following encephalitis viruses: western equine, St. Louis, eastern equine, Japanese B, West Nile, and the "California virus."

In low concentrations it exhibited characteristics only of western equine and St. Louis types.

Dr. Hammon said that postulation of the theory that the new agent is a "stem" virus would explain much confusing evidence gathered in his researches on encephalitis in recent years.

For example, he and his colleagues have encountered a number of cases of double infection, patients with both western equine and St. Louis viruses. The number of these double infections is too high to be considered as due to chance alone.

Further, double infections in chickens,

one of the reservoirs of the disease, have been about twice as frequent as could be expected on the basis of chance alone.

"The existence of a stem virus containing antigens to both would offer an easy explanation for these confusing findings," Dr. Hammon said.

The scientist said he expects new viruses of encephalitis will be found, and that further evidence of a common origin for all of this group will be found.

At the present time the scientist and his colleagues are attempting to propagate BFS-867 and other encephalitis viruses in one of their natural hosts, the wild bird mites. The difficulties of doing this may prevent positive identification of BFS-867. The scientists have recently found that the bird mites appear only with the hatching of a clutch of eggs, and so it is necessary to have mating birds in order to have mites to infect and work with.

"Sleeping sickness" appears seasonally in the hot coast valleys, in the Midwest, in the Orient, in Africa and in other parts of the world. It strikes the higher nerve centers, sometimes causes death, and, par-

ticularly in the young, sometimes results in permanent brain injury.

Dr. Hammon's research is sponsored by the National Foundation for Infantile Paralysis, the U. S. Army Virus and Rickettsial Disease Commission and California public health agencies.

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CHEMISTRY

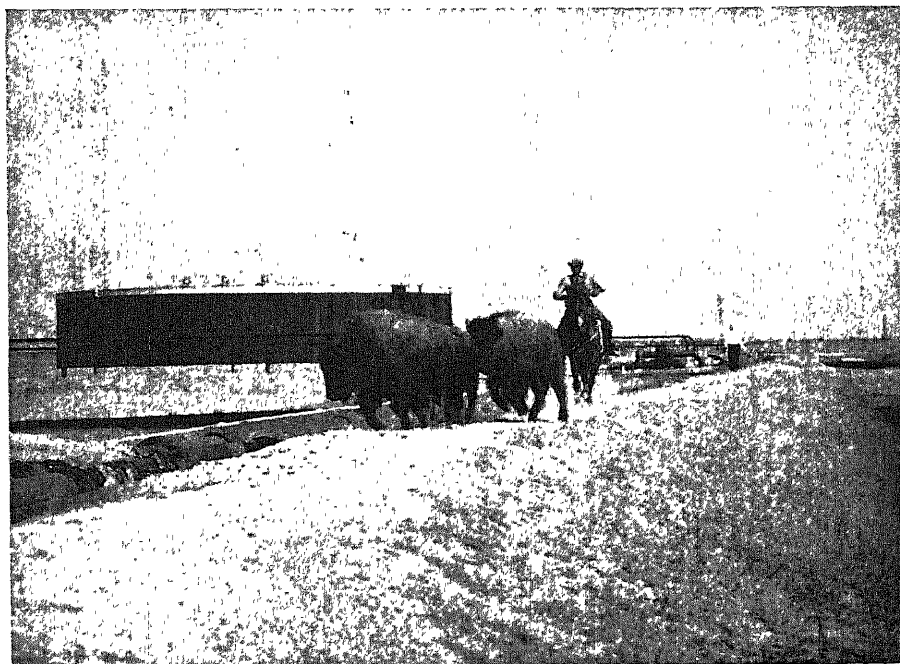
Yellow Powder Developed That Gives Off Oxygen

➤ A YELLOW POWDER which makes it possible for a man to carry his own atmosphere along with him was developed by chemists working for the Naval Research Laboratory during the war. This yellow powder is a potassium oxide. It has the ability to give off life-sustaining oxygen.

This use of a potassium oxide was described by Dr. B. D. Van Evera of George Washington University as a guest of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

This potassium oxide promises to play an important part in fire fighting, high altitude flying, submarines and possibly even rockets to the moon. It can be used to supply oxygen in a mask, providing this necessary element to a man inside a burning building or outside the earth's own atmosphere. A small can of it will last for hours.

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BUFFALO PUT TO WORK—Probably for the first time these animals are being used in industry to reduce grass cutting bills. They are being experimented with around tanks and pipelines in Gulf Oil's refinery.

ETHNOLOGY

Different Language Spoken By Each Sex Among Caribs

► MEN AND WOMEN frequently accuse the other of speaking a different language, but in one of the Western Hemisphere's most ferocious tribes of Indians this was literally true.

The Carib Indians of the West Indies had different languages for the two sexes. Women had to know the "man language" which was used when they talked to the men.

Other customs and traits of the Caribs may have helped give the American Indian a bad name among Europeans for centuries, Dr. Irving Rouse of Yale University states in a study of the Caribs which has just been issued by the Smithsonian Institution.

The modern word, "cannibal," is believed to come from the names, Calinagos and Caribales, which the Caribs were called. They were super-man-eaters, who raided other tribes frequently. Captured men were roasted and eaten, while women were enslaved.

The Caribs were also heavy drinkers, making beer from sweet potatoes. They smoked cigars and used chewing tobacco as money.

There are still some 500 Caribs on the British island, Dominica, in the West Indies.

Science News Letter, September 4, 1948

METEOROLOGY

Weather Observers May Report Via Walky-Talky

► COOLEST NEWS in the midst of the heat wave now gripping the East and Midwest concerns the weatherman of the future.

Meteorologists traveling singly or in pairs will cover the Arctic wastes, reporting weather observations via walky-talky, a University of Michigan scientist predicted in the journal, *SCIENCE* (Aug. 27).

Submarines, aircraft or trucks may be used to keep the wandering weather reporters of the Arctic supplied with food, Dr. William H. Hobbs suggested.

With enough observers covering carefully planned routes, it would be possible to have a daily weather map of the Arctic, which would aid forecasting here as well as in the far north.

Science News Letter, September 4, 1948

BOTANY

Seeds Collected in 1903 Found to Germinate

► IT WAS 45 years ago that a University of Arizona professor collected some seeds from the desert bush or small tree, mesquite. The scientist carefully mounted his

herbarium specimens, noting the date they were collected.

The seeds remained mounted in the collection until last December when scientists of the Southwestern Forest and Range Experiment Station in Tucson, Ariz., took them off the sheet. Two of the five seeds began to absorb water immediately when placed between wet cloths, and one of them germinated. Two others germinated after their coats were nicked with a file.

That these shrub seeds would grow after being mounted for more than four decades may have practical importance in the Southwest, declared S. Clark Martin of the experiment station, in his report to the journal, *ECOLOGY* (July).

Years after land is cleared, mesquite may suddenly appear, he pointed out, because of the longevity of the seeds.

Science News Letter, September 4, 1948

INVENTION

Germanium-Helium Alloys For Rectifiers Patented

► GERMANIUM-HELIUM ALLOYS, suitable for making high-grade rectifiers to convert alternating current into direct current, and methods of making the alloys, have been awarded a patent.

Randall M. Whaley, West Lafayette, Ind., assigned the patent, No. 2,447,829, to the Purdue University Research Foundation. The new developments were made at Purdue in conjunction with work carried out under the direction of Dr. Karl Lark-Horowitz. Use of the metal, germanium, in rectifiers is one of several important applications developed under the direction of Dr. Lark-Horowitz.

The germanium-helium alloys just patented are not alloys as the term is generally used. In this invention germanium metal is impregnated with helium gas. The combination exhibits electrical properties such as are found in metals and in what is known as semi-conductors. These are materials which have high electrical resistance to current passing in one direction, but low resistance in the other.

Impregnation of the germanium with helium may be accomplished by melting pure germanium at a temperature above its melting point of 960 degrees Centigrade to about 1,050 degrees in a boat or crucible in a suitable furnace. The molten metal is then maintained in an atmosphere of helium in the furnace for from five to 15 minutes.

After the germanium and helium are mixed, the melt is allowed to cool. It is cut into wafers, ground and etched. It is ready then to be embodied as the semi-conductor in a contact-type rectifier. Electrical semi-conductors containing germanium have been produced which promise to have varied applications in the fields of radio, radar and microwaves. They may also have application in converting light into electrical effects.

Science News Letter, September 4, 1948



GENERAL SCIENCE

Adequate Street Lighting Cuts Night Traffic Deaths

► THE DEFINITE relation between deaths from night traffic and adequate street lighting is shown by studies recently made by the Street and Traffic Safety Lighting Bureau, of Cleveland, in 12 cities with improved lighting systems. They show that night traffic deaths in these cities decreased 75%, due largely to the better lighting.

The study included widely distributed cities in the United States, stretching from New England to the west coast. The reduction in night deaths, the bureau states, followed the installation of sufficient light to permit motorists to see dangers after dark in time to avoid them.

During 1947, there were 18,400 dark-hour fatalities in the United States and approximately 500,000 injuries. Two-thirds of all traffic deaths result from night accidents. The value of property destroyed in these automobile crashes was over \$500,000,000, the bureau asserts. A nation-wide 75% reduction with modern adequate street lighting would save 13,800 lives a year. In addition, well lighted city streets are well known to be a protection against crimes of all sorts.

Science News Letter, September 4, 1948

WILDLIFE

Animals Enjoy Gardens Treated with Weed-Killer

► ANIMALS just can't resist gardens treated with weed-killer, it appears.

Workers at the Pennsylvania Agricultural Experiment Station at State College, Pa., who are conducting experiments with chemical weed-killers have found this out to their sorrow.

After applying the chemicals, scientists have found that dairy cattle and other livestock, even deer and wildlife of many sorts would flock to the treated areas and eat up the sprayed weeds before they had a chance to study the effectiveness of the chemicals.

The weed-killer has apparently done the raiding animals no harm.

Cows will leave succulent pastures to eat fence row weeds which have been sprayed with plant-destroying chemicals. Rodents seemed to be especially attracted to plots where the weed killing compound, 2,4-D, was under test. These small animals apparently traveled a considerable distance to reach the treated fields.

"Several of the plots were attacked so severely," explains a report from the station, "that yield records could not be compiled."

Science News Letter, September 4, 1948

THE FIELDS

ENGINEERING

Group Air-Conditioning Of Buildings Under Trial

➤ AIR-CONDITIONING from a central plant is being provided for all stores, offices and a motion picture theater in a 16-acre shopping center at a Long Island site within New York City. It is the first installation of its kind.

Heating a group of buildings from a central heating plant is nothing new and the scheme is in successful operation in many American cities. But central air-conditioning is new; this is said to be the first project of this type ever undertaken.

The shopping center where the installation is made is at Fresh Meadows, Long Island, where a 170-acre tract of land is being developed for a residential community of 10,000 persons by the New York Life Insurance Company. To provide the air-conditioning service, two electric-driven centrifugal compressors built by Carrier Corporation, Syracuse, N. Y., are employed.

To furnish air conditioning for the shopping center, chilled water, piped through more than a mile of 12-inch pipe under a 100-pound head pressure, will be delivered to the individual stores. The compressors in the central plant will be supplied with condenser water from two specially bored wells. The used water from the condensers will be returned through two diffusion wells to the same underground strata from which pumped.

Science News Letter, September 4, 1948

PHYSICS

New Watt-Hour Meter Is Suspended by Magnetism

➤ AN ELECTRICAL METER of the watt-hour type, with its rotating disk floating in the air supported by magnetism, was revealed in Spokane, Wash., to the American Institute of Electrical Engineers by H. E. Trekel, L. I. Mendelsohn and J. H. Wright, all of the General Electric Company, Lynn, Mass.

A watt-hour meter is an instrument that records the electric power delivered to a user in terms of watt-hours. The present watt-hour meter has mechanical bearings. These wear out from friction, and have to be checked at intervals. In types with hardened pivots running in bearings of sapphire, checking may be only once in eight years. With this magnetic suspension of the watt-hour rotor little checking will ever be required, and inspection costs to a utility company will be decreased.

By supporting the weight of a watt-hour meter disk magnetically, a bearing system

free from high unit pressures and, hence, free from the fundamental cause of wear, is achieved, they said. The magnetic arrangement employs two concentric magnets of cunico, the inner attached to top of the shaft, the outer attached to the meter frame. Cunico is a magnetic alloy of an advanced type now widely used in permanent magnets.

Magnetic suspension has been found suitable for use in several laboratory precision instruments during the past few years. It permits rotation without mechanical friction. Repulsion-type magnetic suspension is ordinarily employed. With the use of newer magnetic alloys of the alnico and cunico type, it is possible to support a movable magnet by repulsion without excessive demagnetization which occurs with earlier magnets.

Science News Letter, September 4, 1948

BIOCHEMISTRY

New Vitamin Promising For Pernicious Anemia

➤ AN UNIDENTIFIED VITAMIN that gives promise of being effective against pernicious anemia has been produced by bacterial fermentation at Lederle Laboratories Division, American Cyanamid Company.

Known simply as "animal protein factor," the substance is related to the Vitamin B family and is also found in purified liver extract. It is produced by the fermentation of certain immobile, rod-shaped bacteria.

Animal protein factor is now undergoing trials on human beings. In two cases of patients, stricken with pernicious anemia, both responded as if they had been treated with liver extract.

The new vitamin component was first discovered in hen houses. Scientists observed that in warm weather hatchability of new chicks improved. This was traced to a bacterial fermentation which took place in the hen house litter. Further research indicated that the unidentified vitamin was present in liver extract, used medicinally in treating pernicious anemia.

"The next step was to control the fermentation of these vitamin-producing bacteria in order to obtain an extract which would be effective in pernicious anemia," a spokesman for Lederle Laboratories stated.

Research workers at Lederle Laboratories and Western Reserve University, Cleveland, tackled the problem. They isolated many different bacteria in pure culture, grew each in a special medium and tested the product upon chickens. Using the chickens as a "yardstick," they developed a special preparation suitable for treating pernicious anemia in humans.

If clinical tests now in progress prove successful, the source of the anti-pernicious anemia factor will be greatly expanded. At present these factors are obtained by a lengthy process of extraction from liver.

Science News Letter, September 4, 1948

GENERAL SCIENCE

Your Lawnmower May Cut Grass too Short Now

➤ MOST LAWN MOWERS are unfit for use on fine grass this time of year, warns Prof. M. T. Munn, head of the seed testing laboratory at the New York Experiment Station, Geneva, N. Y.

Lawns should not be cut lower than two inches in July and August, explains Prof. Munn. But most mowers will not cut as high as two inches on the level without enlarged wheels or rollers, he charges.

When you cut your grass too short, you may find your blue grass lawn taken over by other grasses and weeds such as plantain, Prof. Munn says. Fine grasses, and blue grasses particularly, are weakened and actually driven out by being cut too low.

Too low is less than an inch and a half in the spring, but at this time of year, two inches is the minimum height, the scientist cautions.

Prof. Munn adds that heavy rolling in the spring, as well as close cutting in the summer, helps drive out fine grasses on lawns.

Science News Letter, September 4, 1948

ELECTRONICS

Krypton Gas Gives Better Fluorescent Lighting

➤ FLUORESCENT LAMPS, using krypton gas instead of argon, were revealed by Westinghouse. They give higher efficiency and, therefore, will decrease electric light bills.

Krypton, one of nature's rarest elements, is used in a new Westinghouse 85-watt fluorescent lamp. It provides a 17% gain in efficiency over the generally used argon gas, Dr. A. M. Hageman of the Westinghouse Lamp Division stated. The 85-watt lamp provides as much light as the 100-watt argon-filled lamp it replaces, and matches its predecessor equally in good maintenance and other features.

Krypton is one of the rare gases found in very small quantities in the atmosphere. The others are helium, neon, argon, and xenon. They are all inert and exist in "trace" quantities. They can be separated by the distillation of liquid air. The substitution of argon for the formerly used nitrogen in electric lamps has saved many millions of dollars. Krypton promises even a greater saving.

Other applications of krypton in lighting have already been made. A quartz tube lamp Westinghouse developed for the airport approach lighting system of the New York International Airport (Idlewild) is filled with this gas. The lightning-like flashes from them are designed to pierce even zero-zero weather for at least 1,000 feet, to guide pilots to the runway. Krypton is also used in a Westinghouse miner's incandescent lamp.

Science News Letter, September 4, 1948

ARCHAEOLOGY

Guardian of Antiquity

Expedition discovers a doorkeeper that has kept his post for more than eight centuries at St. Catherine's Monastery at the foot of Mount Sinai.

By Dr. FRANK THONE

See Front Cover

➤ THE OLD DOORKEEPER was about to leave his job. He was reluctant to give it up, for it was the only one he had ever had, and he had held it for 60 years.

The people he had served faithfully and well through all that time were reluctant, also, to see him go. But there was nothing they could do about it; he could not be held against the call which had now come for him.

For Brother Stephen was dying.

"Father Abbot," he said, as he looked up from his pallet at the bearded face of his superior, "I only wish I might be allowed to keep watch by the door here forever!"

"My son," replied the abbot, "you shall have your wish."

So Brother Stephen died with a smile on his face. And his fellow monks, instead of burying him, robed him in a new habit, with the symbols of his faith embroidered on the scapular, and set him down on a chair beside the door of the crypt that holds the bones of all the departed members of the community, as shown on the cover of this week's SCIENCE NEWS LETTER. There he is sitting still, after more than eight centuries—easily the longest record for holding one job on this insecure planet.

Brother Stephen

This is the story of Brother Stephen, monk of the Greek Orthodox Church at the Monastery of St. Catherine, which stands at the foot of Mount Sinai, the rugged peak where Moses received the Tables of the Law. It was in the sixth century that he took up his long vigil. In the middle of the twentieth, by arrangement with the present head of the monastery, he posed for a portrait before the camera of William Terry, field executive of the University of California African Expedition.

Mr. Terry and his party visited St. Catherine's not on a pious pilgrimage but as a part of their scientific undertaking to amass all possible scientific data about the peoples of Africa, from one end of the great continent to the other.

Strictly speaking, of course, the Sinai peninsula is a part of Asia. However, it sits at the threshold of Africa just as Brother Stephen used to sit before the door of his monastery. Moreover, it is politically a part of the Kingdom of Egypt, and eccle-

siastically St. Catherine's Monastery is subject to the Patriarch of Alexandria. So it could quite legitimately be included in the scope of the African Expedition.

For a physical anthropologist, the monastery appears to be a veritable treasure-house. It has thousands of the kind of specimens that interest him most—human skulls. The skulls are those of former members of the community. And they have been accumulating for nearly 1,600 years, for the monastery claims A. D. 363 as the year of its founding.

When a monk of St. Catherine's dies, he is buried in one of the seven permanent graves in the monastery chapel. He remains there until his flesh has partly disappeared, partly mummified in the dry atmosphere of the desert.

Rotate Seven Graves

The seven graves are used in rotation. As each monk becomes a candidate for occupancy of one of them, the grave that has been occupied longest is opened and the now well-dissipated remains of its tenant are removed.

They are taken to the general storage-vault for bones, watched over by Brother Stephen. The limb bones and the trunk skeleton are added to a great stack at one end, while the skull is added to the mound of skulls at the other. Although the community at St. Catherine's is not large—only 20 monks—it has been there so long that there are plenty of skulls for even the most eager of anthropologists to measure.

Living thus in the constant presence of all their predecessors does not make the monks gloomy or severe. Their business is the contemplation of eternity, and with that point of view they can look upon death quite calmly as a mere incident. To anthropologists also death is not too unpleasant: it is as natural and inevitable at one end of life as birth is at the other. So the scientists and the monks had a common ground on which to meet.

The monks introduced them to another pair of notable early members of their community. These were two exceedingly zealous young monks—now skeletons for many centuries—who took vows to spend their whole lifetime in unceasing prayer, day and night.

They had only entered the monastery, at 18 years of age, when they undertook this heroic feat of asceticism and devotion. Although they lived side by side they never saw each other again. Each stayed in his

cell, and the two were linked together by a chain that ran through an opening in the wall. If either failed to hear the voice of his brother in prayer, indicating that he had fallen asleep, he could tug on the chain and thus arouse him again.

It is probable, of course, that both fell asleep simultaneously at times, else they wouldn't have lived very long. However that may be, they died together as they had lived together, and their bones now rest side by side in a pair of open caskets—still united by the chain.

Patroness of Monastery

Although the monastery of course can offer no hospitality to women, it has one permanent feminine resident, at least in part: the skull and a portion of the hand of St. Catherine of Alexandria, patroness of the institution. Catherine, first of a half-dozen or so female saints of the same name, was a young daughter of the Roman nobility. Converted to Christianity, she was so outspoken an advocate of her faith that she was first tortured and finally beheaded. So now her skull is kept in the monastery at the foot of Mount Sinai as a holy relic.

The monastery itself, though a place of peace, is stoutly walled against a hostile world, for it stands in a region that has been Moslem since the days of Mohammed himself. It has been assailed many times,



ST. CATHERINE'S MONASTERY
—The walled monastery, dating back to the fourth century, nestles against the base of craggy Mount Sinai, an oasis of peace in a savage desert.



PILE OF HUMAN BONES—Two of today's monks at the monastery add to the great pile of bones left by departed members of the community; the skulls go to another stack.

but the nomads could not get over the wall, and they were not equipped with siege engines to breach it. That the wall is really old is attested by marks made on it by visiting western knights during the Crusades.

St. Catherine's Monastery is known to the learned world chiefly as a repository of a

great mass of ancient manuscripts, including some of the oldest known texts of the Bible. Most of these of course are in Greek, but there are hundreds in Syrian, Arabic, Coptic and other languages. Even yet there are thousands of pages that no modern scholar's eye has ever seen.

Science News Letter, September 4, 1948

RADIO-PHYSICS

"Cosmic Noise" Studied

➤ "COSMIC NOISE" which left a region in outer space about 3,000 years ago is interfering with television, radar and FM and short-wave radio communication today. These mysterious energy waves have been recorded and studied by Australian scientists.

This radio frequency radiation comes from a mysterious space in the group of stars which forms the constellation Cygnus, the swan. It is a region where there are very few stars and little visible light.

J. G. Bolton and G. J. Stanley of the Division of Radiophysics of the Council for Scientific and Industrial Research have reported their investigation in the first issue of the new AUSTRALIAN JOURNAL OF SCIENTIFIC RESEARCH (March) published in Melbourne.

The radiation source in Cygnus, they explained, produces the second loudest "cosmic noise" of any place in our galaxy, the Milky Way. A place in the constellation

Sagittarius, the archer, in the center of our Milky Way produces the loudest "cosmic noise" while "solar noise" from the sun produces even greater effects on communications since the sun is so much nearer.

The point in Cygnus which "broadcasts" to earth is unusual because it sends out two kinds of signals. One signal is of constant intensity at about 100 megacycles frequency and above; the other is of varying intensity and uses frequencies below 100 megacycles.

The Australian scientists found that this spot in Cygnus sends 1,500 times more energy to the earth than any point in the surrounding area. The source is probably some 3,000 light years from the earth.

Maps of the sky showing the different frequencies of radiation coming from various spots in the heavens have been made by Grote Reber of the U. S. National Bureau of Standards.

The source of the energy waves is not associated with any stars or nebulae. The

"There are no problem children, only problem environments and parents."

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by LEON SAUL, M.D.

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For its insight into human motives this book has a special value for all those who deal with people, and makes a practical foundation for more extensive reading in the field.

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Do You Know?

In what is called cold cathode *fluorescent lighting*, the lamp has a similar appearance to other fluorescent lighting but the cathode operates relatively cool and no pre-heating is required; when the switch is pressed it lights immediately.

The wily *crow* will abandon a tree formerly used as a roost if he detects any changes made in the vicinity of the roost; he is quick to detect such things as a dynamite bomb installed to destroy him and his flock.

The so-called "*Boston Stone*," recently rededicated in Massachusetts, is a stone two-barrel trough brought from England late in the 17th century and used for grinding oil and pigments for paint by means of large stone ball.

Wheat was practically the only raw material available in large quantities during the war for the production of alcohol, an essential for making munitions and synthetic rubber; corn and molasses, normal sources of industrial alcohol, were scarce.



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Scientists at Institute for Atomic Research, Iowa State College, Ames, Iowa, chose this K-2 potentiometer for its precision and facility of use. They determine current in the magnetic coil of a Beta-Ray Spectrometer by measuring voltage across a standard 0.01 ohm shunt.

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energy probably comes from ionized particles in outer space.

Scientists now believe that the energy comes from protons, positively charged particles which are part of the core of atoms, and negatively charged particles, electrons, in outer space. Radio frequency energy is sent out to earth when an elec-

tron, which has been attracted by a proton until it circles around and around the tiny particle as a comet circles around the sun, finally manages to pull away. When this happens, energy of radio wave frequency is released. This process is called free-free electron transition.

Science News Letter, September 4, 1948

ASTRONOMY

Stars Eject Cosmic Rays

➤ COSMIC RAYS, created in the atmospheres of certain stars whose magnetic field fluctuates violently, are shot forth periodically from these stars.

This latest theory of the birth of cosmic rays is advanced by Dr. Horace W. Babcock of Mount Wilson Observatory of the Carnegie Institution of Washington.

The random directions from which cosmic rays approach the earth would thus be explained, Dr. Babcock points out. Full details concerning his new theory appear in the *PHYSICAL REVIEW* (August 15).

The number and distribution of magnetically active stars is not yet definitely known, but they are probably fairly numerous throughout the disk-shaped galaxy.

It was Dr. Babcock's continued study of the peculiar star HD 125248 that led him to picture such stars as ejecting cosmic rays. In this star, the polar magnetic field regularly changes from plus 7,800 gauss to minus 6,500 gauss, and back, in 9.295 days.

The star's alternating magnetic field sug-

gests that at certain phases the suppressing effect of space charge that tends to keep cosmic rays close to the star will be eliminated. Periodically positive ions and electrons, Dr. Babcock reasons, are ejected alternately from the polar regions of the star at certain phases of each magnetic cycle.

Lines in the star's spectrum change in intensity as indicators of the changing magnetic cycle. The width of the europium lines, for instance, is greatest when the star's magnetic field reaches maximum; the chromium lines are widest when the greatest negative magnetic intensity is attained.

About a score of these peculiar variable stars, brighter than the sixth magnitude and thus visible to the naked eye, are known. All are suspected to have varying magnetic fields. But these magnetic variations are more fundamental than the mere changes in line intensity would indicate, the Mount Wilson astronomer says.

Science News Letter, September 4, 1948

ASTRONOMY

Satellite Missile Needed

➤ DEVELOPMENT of a satellite missile which, like a moon, will continuously circle around the earth—600 miles or so above the surface—is being seriously considered by American scientists.

This was revealed to the Association of Terrestrial Magnitude, affiliate of the International Union of Geodesy and Geophysics, Oslo, Norway, in a communication from Dr. James A. Van Allen of the Applied Physics Laboratory of Johns Hopkins University.

Such a missile would carry scientific instruments needed to collect data about the rarefied atmosphere surrounding the earth. Once started, no fuel would be needed to keep the missile circling around our planet.

In the even dimmer future is the prospect of astronomical flights into space, Dr. Van Allen's statement said.

Today rockets enable scientists to explore the upper atmosphere by carrying apparatus high above the earth. Many missing links in the physics of the upper air will be filled in through the help of these instruments.

Since this rocket research began two years ago, scientists have:

1. Measured the cosmic ray intensity above the atmosphere.
2. Captured samples of air 35 miles above the earth's surface.
3. Produced smoke puffs and smoke trails at high altitudes to study wind velocities.
4. Measured the atmospheric temperature and pressure up to 40 miles.
5. Extended the solar spectrum far into the ultraviolet.

Up to July 1, some 31 V-2's had been fired with upper atmosphere equipment as the primary payload. Twenty-one of these flights have been successful, attaining summit altitudes ranging from 62 to 114 miles, with an average of 84 miles.

Data obtained through rockets have been captured by two principal methods:

1. By radio from a suitable multi-channel transmitter in the rocket to a system of receiving and recording stations on the ground. This is called telemetering.

2. By actually recovering the records produced within the rocket during flight.

It was soon realized, Dr. Van Allen continued, that captured German V-2's, converted from war to peacetime use, would provide at best a series of high altitude

flights of limited extent. Furthermore, the V-2's are extremely complicated and expensive. Consequently a small, relatively inexpensive rocket called the Aerobee was developed for use in carrying equipment into the upper air.

Leading research agencies primarily responsible for the rocket experiments are: the Naval Research Laboratory; the General Electric Company, under the sponsorship of the Army Ordnance Department; the Air Material Command of the Air Force; the Army Signal Corps Labora-

tories; Princeton University; and the Applied Physics Laboratory of Johns Hopkins University, under the sponsorship of the Navy Bureau of Ordnance.

Dr. Van Allen pointed out that all high altitude experiments to date have been made over the White Sands, N. Mex., Proving Ground. Before we begin to really learn about the upper air, he said, repeated flights with identical instruments must be made at different geographical locations, at different seasons, at different times of year.

Science News Letter, September 4, 1948

MEDICINE

New Artificial Kidneys

Two methods for removing wastes from the blood when the kidney has stopped functioning, are presented. These devices simulate natural processes.

➤ ARTIFICIAL man-made kidneys can now be hooked onto the human body's blood vessels in an emergency to cleanse the vital fluid of wastes that would cause death.

Two artificial kidneys are being announced to the scientific world. One of these is a completely new type that is simply a sheet of cellophane sandwiched between two rubber pads.

This imitates the action of the natural kidney by allowing blood to pass through its "vessels" which in this case are grooves. On the other side of the cellophane another set of grooves in the rubber carry chemical solutions in the opposite direction. These snatch the impurities from the blood and return it, cleansed, to the body.

This new apparatus is reported to the journal, *SCIENCE* (Aug. 27) by Jack R. Leonards of Western Reserve University in Cleveland and Leonard T. Skeggs, Jr., formerly of Cleveland, now with the Crile Veterans Administration Hospital in Parma, Ohio.

Chemical solutions do the work which the kidney neglects because of disease or absence. They separate the sugar, salt and water in the blood, concentrate the waste products which are urine, and remove them.

They explained that this apparatus shows promise both as a laboratory tool and as an artificial kidney. It has the advantage, they declared, of being efficient, easily sterilized since the entire apparatus can be immersed in a laboratory pressure cooker, and of having a large surface through which solutions can be passed.

Another artificial kidney which filters the waste products in the blood through a cellulose membrane has been developed by three Canadian researchers. Dr. Gordon Murray, Dr. Edmund DeLorme, and Newell Thomas, of Toronto, report their developments in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Aug. 28).

A pump is used by this machine to remove by means of a tube the blood from the large trunk vein of the body, pass it through the membrane and into the opposite vein of the flank.

The membrane is subjected to a chemical bath while the blood passes through it so that the poisonous body substances can be removed. In addition, heparin, an anti-blood-clotting substance, is added.

The Canadian scientists report that the apparatus has been successfully used on patients and several days of treatment causes no ill effects.

Science News Letter, September 4, 1948

VETERINARY MEDICINE

Brucellosis Found To Be Transmitted Through Air

➤ BRUCELLOSIS, also called undulant fever and Malta fever, can be transmitted through the air, it is revealed in the *JOURNAL OF INFECTIOUS DISEASES* (Aug. 30).

A British scientist, Dr. David W. Henderson, and Dr. Sanford S. Elberg, of the University of California, reported that monkeys, mice and guinea pigs were infected by exposing them to an artificial cloud containing brucellosis organisms.

Infection by the drinking of infected milk or through the skin from the handling of diseased livestock are the only routes that previously had been scientifically demonstrated, though the air route was suspected.

The scientists said that man can probably be infected by the air route as well as animals, though this remains to be proved by definite evidence. Drs. Henderson and Elberg reported they were able to determine the concentration of *Brucella* organisms in the air needed to cause infection; and that it is probable that such a concentration would be present in stockyards during the slaughtering season.

Dr. Elberg revealed that there was a rather high incidence of the disease among certain laboratory personnel during the experimentation, carried on during the war at the Army's Camp Detrick, Md., bacteriological warfare laboratories.

Airborne transmission was indicated in many of these cases. Frequently there were no accidents which could explain transmission of the disease on the basis of handling or drinking of infected material. Air and dust tests in the laboratory showed the organisms existed in these media, and strengthened the possibility of airborne transmission.

Brucellosis is a generalized infection marked by intermittent undulatory fever, malaise, cervical pain, headache, sweating, weakness and anemia. There are three types of the infection: porcine (swine); bovine (cow) and caprine (goat). The last was the first type reported, being discovered on the island of Malta.

The occurrence of swine type brucellosis is high among stockyard workers, and the three varieties are frequently found in the general population. While 27,299 cases were reported in the U. S. for 1940-46, scientists estimate the actual number of cases is much larger.

Science News Letter, September 4, 1948

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PSYCHOLOGY

GI's Queries on Sex

➤ HERE ARE SOME of the questions asked by GI's in Germany about sex:

What are the best methods of birth control?

Can exposure to radar or high-altitude flying make men sterile?

Will wives separated from their husbands for long periods suffer psychological ill effects from abstinence?

These are only a few of the 1,127 questions asked by GI audiences of lecture teams who traveled throughout the German occupation zone.

Dr. Alfred C. Kinsey of the University of Indiana, called his now-famous report, "Sexual Behavior in the Human Male." Dr. Fred Brown of Mount Sinai Hospital calls his report on GI sex questions, "What American Men Want to Know About Sex." It is published in THE JOURNAL OF SOCIAL PSYCHOLOGY.

Birth control questions were the most-asked, with persistent interest shown in the so-called "rhythm method" of contraception.

Curiosity about sex expression and questions on sterility were tied for second place in frequency among the queries put to the lecturers.

More than 20,000 U. S. troops in Germany during the first six months of 1946 attended the panel on sex—called "Sex: Fallacies, Facts and Problems"—which Dr. Brown originated. GI's were encouraged to ask questions. The list which Dr. Brown reports on was compiled from the queries by the soldiers.

The GI's in Germany were concerned over possible effects of abstinence, both on themselves and on their wives.

Some of their questions betrayed interest in some of the more popular fallacies about sex. They wanted to know about the effect of foods such as oysters or eggs on potency. Others asked about tobacco or alcohol. A published report that a German prisoner

had undergone a sex transformation brought frequent questions about sex abnormalities.

Dr. Brown found that the program indicated great ignorance of sex. There is a need, he declared, "for reliable sex information in America."

"Sex Hygiene" lectures given in colleges and universities are "too guarded and overloaded with moral admonitions and pre-

cautions to meet the needs of adults," Dr. Brown charged. Lectures on sex, he commented, too often discuss what the lecturer believes is important, not what his audience wants to know.

A program such as the sex panel for GI's in Germany should be given in high schools and colleges, he suggested.

Not included in the list of frequently asked questions, Dr. Brown pointed out, was one which was heard often from the floor during the panel discussions:

Why are questions of sex so avoided by the American people?

Science News Letter, September 4, 1948

RADIO

Radio Transmission Coded

➤ AFTER MARCONI demonstrated radio 50 years ago, its first application for transmitting intelligence used a telegraphic code consisting of a series of short pulses. Later, radio was developed for speech transmission, but recent developments again use a code of short pulses, this time for the transmission of speech. A complete cycle has been made back to something like the telegraphic code used by Marconi.

This new development was described to the American Institute of Electrical Engineers by H. I. Romnes of the American Telephone and Telegraph Company, New York. The system is known as pulse code modulation. In this samples of a speech wave, taken at intervals, are transmitted instead of the continuous wave.

In the system explained by Mr. Romnes, samples of the speech wave are taken 8,000 times a second and each sample is translated into a seven-unit code which carries over the radio circuit information as to the magnitude of the sample, thus permitting the speech wave to be reconstructed at the receiving end.

Systems have been built in the laboratory in which information as to samples from 100 different speech channels may be transmitted over the same radio channel on a time-sharing basis, he stated.

The advantage is that there can be great disturbances, variations and distortions in the transmission medium without affecting the quality of the speech, since it is only necessary to determine at the receiver whether the signal is present or absent, with no gradations in between, in order to perfectly reconstruct the original speech signal. In this system millions of signal pulses are sent each second, while in the system used by Marconi only tens of pulses per second were sent.

Science News Letter, September 4, 1948

Electric Energy Dear

➤ COMPARATIVE costs of transmitting energy in the form of coal, gas, oil and electricity were presented at the same

meeting by R. E. Pierce and E. E. George, both of Ebasco Services, Inc., New York City. It has been rather usual practice to locate power plants near fuel and water and transmit the energy electrically to the load. If the transmission of electrical energy produced from fuel involved distances in the order of 200 miles, the economics of the practice is questionable, they said.

Electric transmission at high load factors is competitive with hauling coal for any distance up to several hundred miles. Electric transmission is generally much more expensive than transporting energy by gas or oil pipe lines. If gas or oil is to be used for fuel, a power plant location near where the electricity is to be used will always be the most economical, they declared.

From hydroelectric plants energy is transmitted as electricity. The so-called "cheap power" from such sources is not cheap if the energy has to be transmitted to a distant market. With the investment cost of a hydro plant generally greater than for a similar size steam plant, hydro power would be more costly than steam power by the time it was delivered a few hundred miles away. In areas of low fuel cost, hydro power transmitted even shorter distances would be more expensive than steam power.

Science News Letter, September 4, 1948

METEOROLOGY

Artificial Rain Making Attempted in India

➤ ARTIFICIAL RAIN MAKING is being attempted in western India because of delay in the arrival of the rains of the monsoon. Ice pellets will be dropped from airplanes in an attempt to bring moisture to the suffering millet and rice crops.

The Indian Embassy in Washington is inviting cooperation from American scientific institutions in the experiments which are in the newly-grouped states called Saurashtra.

Science News Letter, September 4, 1948

Plastic Coasters and Tiles

EMBED REAL FLOWERS in NEW Magic PLASTIC

Now create many unusual things like the distinctive pansy coaster shown—made by embedding real pansies in Castolite—the "magic" liquid casting plastic. Comes crystal clear, or may be dyed to produce striking color effects. Make really different jewelry, book ends, picture frames, candle sticks, figurines. Embed real flowers, butterflies, coins, medals, photos, for plaques, paper weights, tiles, other art objects. Use only home tools. Follow simple step by step method. New pleasure, fine profits are possible. Send 25c for exciting new Home Project Manual showing how to get started. Write today.

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THE COMMUNICATION OF IDEAS: A Series of Addresses—Lyman Bryson—*Harper*, 296 p., \$3.50. Based principally on lectures in a course of the Institute for Religious and Social Studies. Very helpful to those who wish to express themselves clearly.

DICTATORS AND DISCIPLES FROM CAESAR TO STALIN: A Psychoanalytic Interpretation of History—Gustav Bychowski—*International Universities Press*, 264 p., \$4.25. This analysis of the conditions that produce dictators and their willing followers is intended to serve toward their prevention and a more rational shaping of history.

ELEMENTARY TEACHERS GUIDE TO FREE CURRICULUM MATERIALS—John Guy Fowlkes and Donald A. Morgan, Eds.—*Educators Progress Service*, 5th ed., 208 p., paper, \$4.50. Listed by subject with a title index and alphabetical list of sources.

ELIMINATION OF WATER FROM WET CRUDE OIL OBTAINED FROM BITUMINOUS SAND BY THE HOT WATER WASHING PROCESS—K. A. Clark and D. S. Pasternack—*Research Council of Alberta*, 10 p., illus., paper, free upon request direct to publishers.

INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE—W. H. Camp, H. W. Rickett and C. A. Westherby—*Chronica Botanica*, 120 p., \$3.50. This is the second printing of a previously limited edition for members of the American Society of Plant Taxonomists. The rules were adopted and revised by the International Botanical Congress of Amsterdam, 1935.

MAN IN THE MODERN WORLD: An Eminent Scientist Looks at Life Today—Julian Huxley—*New American Library*, 191 p., paper, 35 cents. Philosophical essays from two books originally published by Harper, *Man Stands Alone* and *On Living in a Revolution*.

THE METRIC SYSTEM OF WEIGHTS AND MEASURES: The National Council of Teachers of Mathematics—Twentieth Yearbook—Committee on the Metric System—*Bureau of Publications, Teachers College*, 303 p., illus., \$3.00. A survey of the history, nature and advantages of this system.

RADAR SCANNERS AND RADOMES—W. M. Cady, M. B. Karelitz and Louis A. Turner, Eds.—*McGraw-Hill*, 491 p., illus., \$7.00. A radar scanner is the assembly consisting of the antenna and the mechanism that causes the radiated beam to scan. Of interest particularly to mechanical and electrical engineers.

SALT, THE FIFTH ELEMENT: The Story of a Basic American Industry—Garnett Laidlaw Eskew—*J. G. Ferguson*, 289 p., illus., \$3.00. The romantically written history of the sale and use of a common but important article of daily life.

SOME RECENT CONCEPTIONS OF COAL STRUCTURE—A. McCulloch—*Research Council of Alberta*, 6 p., illus., paper, free upon request direct to publisher.

SUCCESSFUL MARRIAGE: An Authoritative Guide to Problems Related to Marriage from the Beginning of Sexual Attraction to Matrimony and the Successful Rearing of a Family—Morris Fishbein and Ernest W. Burgess, Eds.—*Doubleday*, 547 p., illus., \$6.00. A refer-

ence book for marriage counselors, newlyweds, and parents.

SURVIVAL OR SUICIDE: A Summons to Old and Young to Build a United, Peaceful World—Harry H. Moore, Ed.—*Harper*, 209 p., illus., \$2.00. A number of authors contribute the chapters that describe the crises brought about by the discovery of atomic energy. Food for serious thought as international friction grows.

THIRTY-FIRST ANNUAL REPORT OF THE NATIONAL RESEARCH COUNCIL OF CANADA, 1947-48—*National Research Council of Canada*, 26 p., paper, free upon request to publisher. Appears in both French and English.

WARTIME COLLEGE TRAINING PROGRAMS OF THE ARMED SERVICES—Henry C. Herge and others—*American Council on Education*, 214 p., illus., \$3.00. A review of what institutions of higher education contributed and what they gained from World War II experience.

Science News Letter, September 4, 1948

ANTHROPOLOGY

Gather Most Complete Skull and Bone Collection

➤ WORLD'S MOST COMPLETE collection of the skulls and bones which trace the development of man from his most primitive stages is now being built up at the Smithsonian Institution in Washington.

Casts of bones scattered throughout the world will be made to give the Institution a complete collection of existing specimens. This will enable scholars to study the skulls and other bones without traveling to many different places or relying on the descriptions made by other scientists.

The casts will also give an accurate copy in event of loss of an original specimen. This has happened in the case of the skulls of China man, which disappeared from Peiping during the war and are believed to have been lost at sea. Casts of the skulls of China man were made before the war and are in the Smithsonian collection.

Science News Letter, September 4, 1948

CHEMISTRY

Storage System Process Preserves Cottage Cheese

➤ COTTAGE CHEESE that looks like and tastes like freshly-made cheese after months of storage in a frozen condition is promised by a new process for which a government patent has been issued.

Ordinarily when cottage cheese made in the season of peak production is frozen for use later in the season of low production, it comes out with a chalky, crumbly structure and a mealy, mushy consistency. In the new process the thawed cheese has the

firm body and the soft texture of fresh cheese.

In this method the curd is set with a coagulating enzyme, such as rennet or pepsin or a mixture of the two, cutting the curd when the whey acidity is between 0.25% and 0.45%, and cooking the curd to produce a rubbery, tough body. This is then frozen to break down the rubbery, tough body. When thawed the cheese is ready for immediate consumption, and consumers will never know that it has been frozen.

Patent 2,446,550 was granted for this cottage cheese preservation process to Gerald C. North and Lawrence Little, Chicago, Ill. They have assigned the patent to Beatrice Creamery Company of the same city.

Science News Letter, September 4, 1948

Science Service Radio

➤ LISTEN in to a discussion on new discoveries in biology on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDST Saturday, Sept. 11. Watson Davis, director of Science Service, will have as his guests Dr. Ralph Cleland, chairman of the American Institute of Biological Sciences, and Dr. Raymond L. Zwerner, Executive Secretary of the National Academy of Sciences. They will give reports of the convention of the ten Biological Societies, which are meeting in cooperation with the American Institute of Biological Sciences, and a preview of the centennial meeting of the American Association for the Advancement of Science, which will meet the following week.

Science News Letter, September 4, 1948

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⚙️ **LEMON SQUEEZER**, for use at the table to add juice to fish or other foods, is a gravy-boat-shaped transparent plastic pitcher with a hinged top under which a quarter-lemon may be placed. When the two handles are brought together the lemon is squeezed and the juice strained in one operation.

Science News Letter, September 4, 1948

⚙️ **PLASTIC COMPASS**, ruler, protractor and T-square in the same unit has one end equipped with a magnifying plastic button which permits accuracy when placing over a point to serve as a circle center. One edge of the device has pencil-point holes for making circles of five-eighths to six inches in diameter.

Science News Letter, September 4, 1948

⚙️ **TOY WATERWAYS**, for boys and their dads, are sectional plastic canals for tiny boats or plastic ducks. They may be purchased with plastic circulating pumps to supply currents to move motorless boats, or without it self-propelled boats are used. Raising and lowering locks are furnished if wanted.

Science News Letter, September 4, 1948

⚙️ **METHOD OF CLASSIFYING** infor-



mation and then finding it again uses a random number code. Half a dozen different subjects can be listed on each card by notches and then combinations of these subjects can be searched for by a sorting box. Complex or simple chemicals used in research can be classified and searched for

new and special uses.

Science News Letter, September 4, 1948

⚙️ **ELECTRO-MECHANICAL** recorder, installed inside coin vending machines, gives a printed coin count against drinks and other products dispensed. In addition, it provides a continuous, permanent, legibly printed record for accounting and other departments, with nine duplicates if desired.

Science News Letter, September 4, 1948

⚙️ **AIR-PRESSURE DEVICE**, to transfer with safety a liquid from one container to another, as from an oil-can to a camp stove; is a two-holed plug to fit the original container with an air-pumping tube with a bulb on its end and a delivery tube. The latter extends to near the bottom of the original container.

Science News Letter, September 4, 1948

⚙️ **NYLON-COATED WIRE** rope is made in sizes suitable for uses ranging from carriage-returns on typewriters to steam-shovel cables. The ropes operate at high or low temperatures, are flexible when wet or dry, and the nylon coating protects the wire and is itself unaffected by oils, cleansing agents, marine growths and alkalis.

Science News Letter, September 4, 1948

• Nature Ramblings by Frank Thone •

➤ **GENERATIONS** of American school children have learned to recite Longfellow's immortal poem about the village blacksmith shop that stood under a spreading chestnut tree. Most of them, it is safe to guess, have taken the tree's name at its face value. They have thought of it as a large specimen of the now almost extinct species *Castanea dentata*, once producer of the tastiest edible chestnuts in the world but virtually wiped out during the present century by the deadly blight fungus.

Alas for the easy assumptions of youth! Longfellow's "spreading chestnut tree" was not a chestnut at all, but a horse-chestnut, belonging to the quite different genus, *Aesculus*. The chair made for Longfellow out of some of its wood, when it was felled years after he wrote the poem, is still preserved in the Longfellow House in Cambridge, along with other specimens from the same tree. They are all unmis-

Longfellow's Chestnut Tree



takeable horse-chestnut wood, not true chestnut.

When you come to think of it, however, it is not at all remarkable that Longfellow should have applied the name in the way he did. He had got much of his education abroad, in lands where the horse-chestnut

was, and still is, a favorite for street and park planting. The beauty of Paris in spring, for example, which has inspired many a poet since Longfellow's time, is due in part to the blossoming of the lovely candelabrum-like flower-clusters of its many horse-chestnut trees. And since the horse-chestnut is often called simple "chestnut" in the colloquial speech of many Europeans, it is only natural that Longfellow should have picked up the usage in that way.

The horse-chestnut usually planted, known botanically as *Aesculus Hippocastanum*, is not native to this continent, but was brought here from Europe. There are several species in the same genus that are native Americans, found mainly in the originally forested area east of the Mississippi; these are usually known by the folk-name of buckeye.

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



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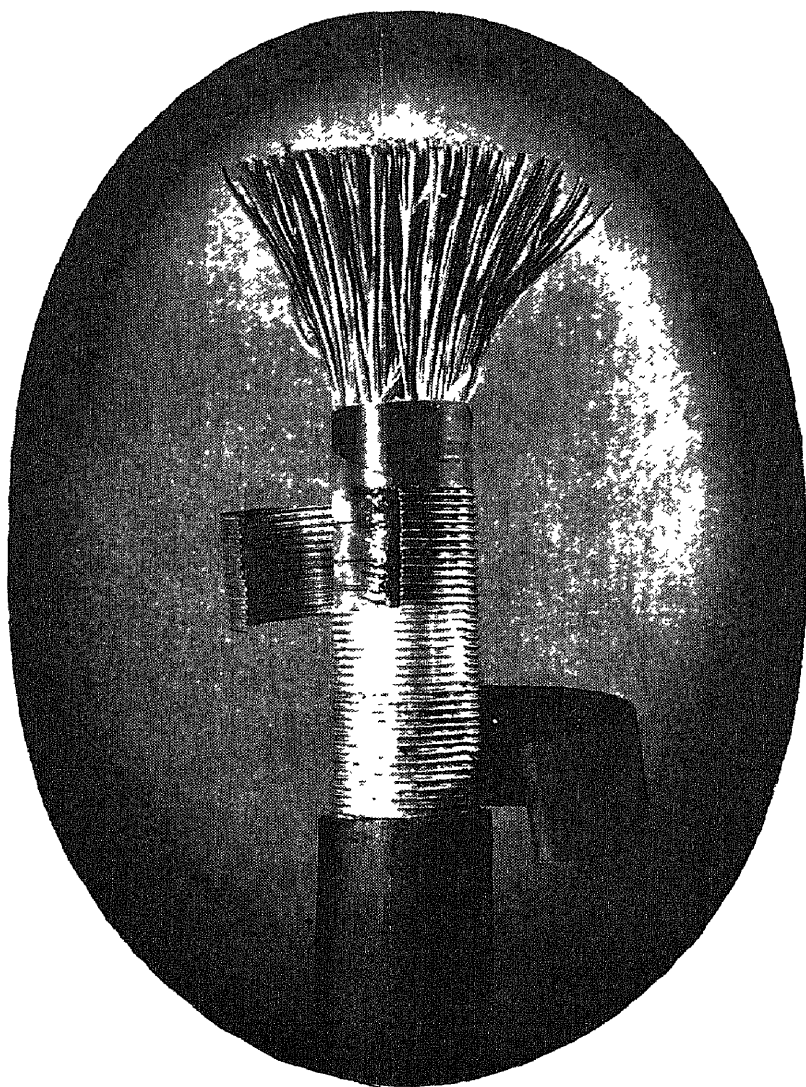
ALPETH

NEW WORD ON TELEPHONE CABLES

Lead makes an excellent sheath for telephone cables — sixty years and thousands of miles in service have well proven that. But lead is useful in other ways—storage batteries and paint, to name only two. So the telephone industry shares the limited available supply with other claimants.

Before the war when there was no lead shortage, Bell Laboratories engineers sought to develop better and cheaper cable sheaths. An ideal sheath is strong, flexible, moisture-proof, durable and must meet specific electrical requirements. No single material had all those virtues, so thoughts turned to a composite sheath, each element of which should make a specific contribution to the whole.

Various materials and combinations were studied. Desirable combinations that satisfactorily met the laboratory tests were made up in experimental lengths, and spent the war years hung on pole lines and buried in the ground. After the war, with an unparalleled demand for cable and with lead in short



supply, selection was made of a strong composite sheath of ALuminum and PolyETHylene. Now Western Electric is meeting a part of the Bell System's needs with "ALPETH" sheathed cable.

Meeting emergencies — whether they be storm, flood or shortage of materials — is a Bell System job in which the Laboratories are proud to take part.

BELL TELEPHONE LABORATORIES

• EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR
CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE.



CHEMISTRY

New Insect Enemy Found

A cousin of DDT, methoxychlor is a better insecticide, and safe for man, animals, and crops. Only limited quantities are available commercially now.

➤ MAN'S CHEMICAL WARFARE against the insects has been reinforced by a cousin to DDT that doesn't poison man and animals and slays bugs untouched by other insecticides.

It is called methoxychlor. A Du Pont chemist, Dr. C. J. Krister, gave the first full report on this chemical that has now had extensive trials in actual use.

Predicting that it may find a place more important than DDT, Dr. Krister told the American Chemical Society meeting in Washington that methoxychlor is so safe that it can be swallowed by human beings and animals with little danger. Rats fed it in moderate doses over months suffered no adverse effects.

One of the major troubles with DDT has been the danger to animals, particularly cats and other pets, and the low toxicity of methoxychlor is allowing its safe use in controlling lice, flies and other insects that worry cows, pets and man.

The Mexican bean beetle, not adequately controlled by DDT and other similar compounds, is effectively killed by the new insecticide.

Beans, cucumbers, peaches, apples, grapes and other crops that might carry dangerous insecticides to the dinner table may be treated with methoxychlor without danger.

Cows, because fly-free, will give more milk without risk of getting chemical contamination of their milk when sprayed with methoxychlor. It is not picked up and absorbed through the skin and accumulated in the fat of beef cattle.

Flies are knocked down immediately by the new chemical, thus eliminating the need for imported pyrethrum which has to

be used with DDT to put the insects out of commission promptly. Methoxychlor may become the chemical-of-choice in fly fighting.

Methoxychlor is the approved short name for the chemical whose full name is bis (*p*-methoxyphenyl) trichloroethane. Another Du Pont chemist, E. W. Bousquet, synthesized it in 1943 during a methodical search for a compound that was both effective in fighting insects yet safe for use around warm-blooded animals.

So far it has been available in limited quantities commercially under the trade name of Marlate as a wettable powder that can be worked up into a water spray. It costs somewhat more to produce than DDT but is not expected to be markedly more expensive to apply because it promises to be more effective in smaller concentrations.

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Annual Insect Bill

➤ FOUR BILLION DOLLARS is the size of the bill rendered the American people by insects because of their damage to crops each year, Dr. H. L. Haller and Ruth L. Busbey of the Department of Agriculture told the chemists.

This is considerably more than cost of food shipped abroad under the Marshall plan by ECA. (The total ECA expenditure authorized for its first year is slightly more than five billions.)

The government scientists appealed to farmers to increase their protective efforts against insects by use of chemical weapons.

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GENETICS

Seedless Watermelons

➤ THAT HAPPY IDEA which strikes most of us this season of the year—watermelons without seeds—has come true in the laboratory of a Japanese scientist.

Dr. Hitoshi Kihara explained how he has produced the seedless watermelons in his genetics laboratory at Japan's Kyoto Imperial University. His technique consists in scientifically tampering with the heredity of ordinary watermelons.

The watermelons are not entirely seedless, of course. But instead of the more than 500 seeds—count them sometime—in your watermelon, Dr. Kihara's melons may have only one seed. There also are some tender,

white seed-like bits in the melon, but these are edible. And there are fewer of them than the seeds in usual watermelons.

"They are like the seeds which you eat in a cucumber," Dr. Kihara said.

The Japanese scientist visited Washington and delivered a lecture to U. S. Department of Agriculture scientists at nearby Beltsville, Md. He is returning to his laboratory after attending an international meeting in Stockholm, Sweden.

His seedless watermelons are not yet ready for the market, he pointed out. Though most of them are sweet and tender, some of the melons turn up sour and

tough once in a while. In addition, Dr. Kihara hopes to make some improvements in his technique.

First step in producing seedless watermelons is to use a treatment with the chemical, colchicine. The heart of each cell of an ordinary watermelon has two sets of chromosomes, rod-shaped, heredity-bearing bits of protoplasm, the stuff of which the cells of all life are made. Colchicine retards the growth in such a way as to double the sets of chromosomes. This produces a watermelon with four sets of chromosomes in each cell nucleus.

The nearly sexless four-chromosome melon is then crossed back with an ordinary melon. From this is produced a three-chromosome melon, known as a triploid. Dr. Kihara's triploids may point the way toward the day when you can eat seedless watermelons.

Experiments to produce seedless watermelons have been reported previously, but Department of Agriculture officials said that no commercial seedless watermelons have been developed yet. They are following Dr. Kihara's experiments with interest and term them "promising."

The Japanese scientist is best known for his studies of the genetics of wheat. His studies of wheat chromosomes have helped explain the origin and development of modern wheat.

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NEW BREED OF WATERMELON

—Dr. Hitoshi Kihara is shown here with reproductions of a normal melon and one that he has cross-bred to make it seedless. They are not yet ready for the market as improvements in technique have yet to be made to insure uniform results.

Lithgow Library.

Letters To The Editor

Gently Optimistic

Congratulations on "Radioisotopes Cancer Aid" (SNL, Aug. 14, p. 99). Too few articles for lay consumption contain a paragraph such as the fourth one in that article. You are to be highly commended for inserting this and yet keeping a gently optimistic view of the cancer picture. Congratulations again.—S. F. Thomas, M. D., Palo Alto, Calif. *Thanks and we are glad to repeat that paragraph.*

No scientist would be foolhardy enough—or cruel enough to cancer victims—to hold out too much hope in individual cases. Nevertheless, the years of human life to be saved by future applications of radioisotopes promise to compensate many times over the loss of human life due to use of the atomic bomb in warfare—if the world can arrange not to use the atomic bomb as a weapon in the future.

No Freak This

I have the SNL, Aug. 21, with a picture of what looks like honey-comb on the cover. On page 26 I am informed that this is among the first pictures taken of molecules and that "each molecule is a sphere about four ten-thousandths of an inch in diameter." I got out a micrometer and set up on it .0004 and find that it is plainly visible to my unaided eye. I must be a freak.—Chas. C. Finn, Seattle, Wash.

Sadly we must tell you that we relied on a statement from the International Congress on Crystallography. Since checking with Dr. R. W. G. Wyckoff, who took the picture, we were informed that each little dot is approximately one-millionth of an inch in diameter.

Bison on Goering's Estate

I have seen European bison in museums

and also I saw a herd in June, 1938, at Goering's country estate some 40 miles from Berlin. They had some wisent bulls and they were breeding them with American cow bison. Whether any of the cows were pure wisent, I don't know. The wisent I have seen have been, generally speaking, smaller than the American bison and they had longer horns. Your picture (SNL, Aug. 21) seems to me to have horns longer in proportion than those of the American bison; also the shaggy mass of hair over the shoulders is less heavy than the American bison.—Godfrey L. Cabot, Boston, Mass.

Mankind's Salvation?

I read with surprise Mr. Vogt's plan for the salvation of mankind (SNL, Aug. 21, p. 118). He would save mankind by consistently reducing its numbers until there would be nobody left. What would he do then with the soil he would have consistently enriched and conserved? A better plan would be a program of educating those people who are denuding their soil to conserve and enrich it to a better and more efficient production as we are doing here in parts of the United States. Think of the possibility of being without Mr. Vogt himself if his parents had not responded to the powerful drives he speaks about that resulted in his being.—Judge Francis B. Allegratti, Elburn, Ill.

Fact Compilations Suggested

Every so often I go back to SNL, June 19, and again read with renewed interest "Laws of Matter Up-To-Date" by Helen M. Davis. To me this five-column article is a marvel of compact, useful, complete and important information the equal of which I have not seen elsewhere.

This suggests similar articles on various subjects that present themselves; for instance, the field of radiation from cosmic rays to the longest radio rays and everything in between, the elements arranged by number with their isotopes, and astronomy might be similarly treated. May we hope for something along these lines?—George W. Funck, M. D. (Retired), Englewood, Florida.

Others are in preparation, thanks. Our "Periodic Table of the Elements" 10" x 15" chart reprinted from December 1947 CHEMISTRY, a Science Service publication, is available at 25 cents each, 10 copies for \$1.00.

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Question Box

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DENTISTRY

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MEDICINE

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NUCLEAR PHYSICS

What is delaying the use of atomic power in industry? p. 170

PHYSICS

Where will the world's most powerful linear accelerator be built? p. 169

MEDICINE

Test Drug on Human Polio

New sulfa drug, phenosulfazole, for the first time has been given to human victims of the disease to study its effect. Five research teams are cooperating.

► AN EXTENSIVE TEST of the new anti-virus sulfa drug, phenosulfazole, upon human patients suffering from infantile paralysis is underway through cooperation of five research teams in New York, Texas and North Carolina. This was announced officially by Columbia University.

Although no results upon human cases were reported, the new drug was stated to have "successfully halted a polio virus in the mouse" in a series of investigations at Columbia University and the Lederle Laboratories.

How for the first time a virus disease in mice was successfully attacked by a man-made chemical is being told in a scientific report by Dr. Murray Sanders, associate professor of bacteriology at Columbia, and his associates, appearing in the fall issue of *TEXAS REPORTS ON BIOLOGY AND MEDICINE*.

Because of the successful use in mice, the study of the drug's effect on actual cases of human poliomyelitis was begun. The groups now working are at the College of Physicians and Surgeons of Columbia University, the Medical Branch of the University of Texas, the Knickerbocker Hospital in New York City, the Jeff Davis Hospital at Houston, Tex., and the Bowman Gray School of Medicine at Wake Forest College, N. C. (See *SNL*, July 21).

Why victims of poliomyelitis did not receive the new medication during the "vicious poliomyelitis season" from which we are emerging is explained in a statement by Dr. Sanders.

"There are hundreds of families throughout the United States," said Dr. Sanders, "which have suffered terrible losses through death or paralysis of one or more of their members. The sole purpose of this statement is to assure these people that they have not been victims of professional neglect."

Dr. Sanders explained further that polio is a disease with tremendous clinical variability. To investigate properly the therapeutic value of a substance in poliomyelitis, he said, requires a test involving hundreds of cases of the disease studied in the most critical fashion.

"We do not know what effect Darvisul (trade name for phenosulfazole) has on human poliomyelitis," Dr. Sanders continued. "Premature claims for a 'polio cure' are not only unjustified but under present circumstances cruel."

"Drug No. 2," as it has been known since the mouse tests began in September, 1947, had three dramatic results in the mouse: 1. The drug cured in the early stages of the disease. 2. Mice that survived

were immune to reinfection. 3. When the drug was given in a single dose orally, it prevented infection.

The drug does not act directly on the mouse virus, but appears to react on the tissue cell itself. This encouraged the researchers to intensify their efforts because it indicated that the compound would be able to change the physiology of the cell without destroying it, at the same time making it an unsatisfactory site for virus growth.

No ill effects were caused by the drug, although heavy doses (five grams per kilogram of body weight over five days) were given. This lack of toxicity is one of the most important qualities of the drug.

Associated with Dr. Sanders were the late Dr. Yellapragada SubbaRow, Lederle director of research who died Aug. 10, and Mrs. R. C. Alexander, research assistant at Columbia.

Darvisul was the result of a program initiated by Dr. SubbaRow. As a first step, workers at the Calco Division, American Cyanamid Company, in Bound Brook, N. J., synthesized numerous compounds. The team responsible for the synthesizing of Darvisul was composed of Dr. M. E. Hultquist and Dr. Robert Parker.

Once the compounds were synthesized, they were sent to the Lederle Laboratories at Pearl River, N. Y. There, under the direction of Fritz Popken and Miss Kath-

leen Richards, scores of tests were used to determine whether Darvisul and the other compounds possessed anti-viral activity.

The synthetics which showed promise were then given to the College of Physicians and Surgeons, 168th Street, where Dr. Sanders and Mrs. Alexander tested them exhaustively against viruses which affected the nervous system.

The strain of virus selected for use in the study was a mouse virus originally isolated in 1940 at Columbia by Dr. Sanders and Dr. Claus W. Jungeblut.

Scientific therapeutic agents against true animal or human viruses have not heretofore been available.

Darvisul is a white powder which goes into solution only with difficulty. When it was realized in the early stages of the study that the powder was not sufficiently absorbed by the body of the animal, a sodium salt of the drug was made. This salt proved to be soluble, non-toxic and generally satisfactory as an injectable material.

The effect of the drug on 100 macacus rhesus monkeys infected intracerebrally with a human strain of poliomyelitis has also been studied, Dr. Sanders said. Results of this study will be published later.

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ZOOLOGY

British Make U. S. Gift Of Strange Animals

See Front Cover

► THE DORMOUSE, known to thousands of Americans only through children's books by British authors, has arrived in the U. S.

Dr. William Mann, director of the National Zoological Park of the Smithsonian



STAMP FOR RED CROSS FOUNDER—A commemorative postage stamp honoring Clara Barton was issued Sept. 7. Ceremonies were held at her birthplace at Oxford, Mass., the day the stamps went on sale.

Institution in Washington, visited 15 European zoos in six countries during a six-week trip to Europe. But the pair of dormice, which are included in the group of animals he brought back, were not spotted in a zoo.

While visiting in an English home, Dr. Mann heard a noise in the rafters of the house. He was told that it was a dormouse.

Dr. Mann remarked to his English host, a fellow zoo director, that the zoo here

had no dormice, so an exchange of animals was arranged.

A dormouse, it seems, is a small animal with a bushy tail. It looks more like a squirrel than a common mouse.

Another gift from the British zoo is the perodicticus potto shown on the cover of this week's SCIENCE NEWS LETTER. It is a beady-eyed lemur celebrated in West African folklore.

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MEDICINE

New Clubfoot Technique

A cohesive bandage binding the leg and foot of a newborn infant with this deformity has proved highly successful in correcting the condition.

➤ CLUBFOOTED INFANTS are being treated with a high degree of success by a new technique with cohesive bandage which is akin to the Chinese custom of binding the feet of their baby girls.

The advantage of this treatment is that it can be begun the day after birth while the newborn infant is still in the hospital under the care of the physician, Dr. Emil D. W. Hauser of Chicago pointed out.

Moreover, the cohesive bandage does not adhere to or irritate the skin. It is wound firmly around the foot beginning just below the knee with emphasis placed on overcorrecting the deformity. The entire foot and leg are covered with only the very tips of the toes left visible. Over this is placed a stirrup type of bandaging to force the foot into a knock-kneed position. Then an encircling bandage, wound all the way down to the ankle, holds this in place.

The foot needs further support against the constantly contracting muscles so adhesive tape is superimposed in like fashion to prevent the foot from returning to its abnormal position.

Dr. Hauser emphasized that this treatment must be begun immediately after birth. The earlier treatment of clubfoot is begun, the better the correction, for the

younger the child the more rapid is the growth and the softer and more easily changed are structures of the foot, he said. With former methods, such as the use of plaster casts and splints, treatment could not be begun until a baby was from one to three months old.

If treatment begins while the baby is still in the hospital, the bandage is reinforced daily, with more correction in each treatment. At the end of a week a new encasement must be applied because the other usually becomes ill-fitting. The procedure is then repeated at each visit to the doctor.

This corrective bandage must be kept on until the child begins to walk, otherwise the deformity may reoccur, he declared.

Results in 70 patients treated over a period of six years with this technique were highly successful, Dr. Hauser reported to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 4). Although in some cases a tight tendon in the foot did not allow a full correction with the bandage alone, it was possible to lengthen it with surgery. In only a few of these cases did a child fail to develop a normal foot.

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CHEMISTRY

Weed-Killers Aid Crops

➤ CHEMICALS now being investigated at the Army's wartime biological warfare laboratories hold the possibility of increasing the food production of the world so that a population suicide of civilization can be averted.

The same kind of growth-regulating chemicals that make lawns and fields weedless (2,4-D is the common one) can be developed to:

Produce crops of higher yields per acre.
Bring speedier maturity to a crop, either

to foil a late season or grow the plants farther north.

Eliminate the necessity of crop rotation to combat weeds.

Yield seedless, larger and more delicious fruits.

A report presented to the American Chemical Society meeting in Washington, by two chemists from the famous Camp Detrick, Md., R. L. Weintraub and A. G. Norman, gave a glowing forecast of the increased usefulness of plant growth regulators.

Some of these chemicals would have been used to wipe out enemy crops if the war had continued longer.

While the chemical plant regulators have been applied mostly to flowers and fruits, the government chemists predicted that they can be made to have profound effects upon the major food and fiber crops of the world. Field crops as well as specialized crops might be so influenced chemically that they can be grown in climates and upon soils where they cannot now be harvested profitably.

Plants might be modified by chemical treatment to give more resistance to insects and plant diseases.

Earlier flowering and maturity of plants, possible by chemical treatment, would make many crops possible for northern latitudes where the growing season is short.

"A diversity of chemical compounds possess growth regulatory activity," the chemists reported. "There appears to exist a close correlation between activity and molecular structure. Information as to the mechanism of action is as yet scanty."

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CHEMISTRY

New Pain-Killing Drug Coming Out of Laboratory

➤ A NEW pain-killing drug more potent than cocaine and chemicals that give temporary relief from high blood pressure may emerge from the chemical laboratory shortly. These developments reported to the American Chemical Society meeting in Washington need successful use upon human patients before they can be made generally available.

Best of all chemicals tested in a five-year search for local anesthetics, the new pain-killer is known as SKF 538-a and is a complex quinoline synthesized by a new method. Its pain-killing effect in animal experiments lasted much longer than cocaine, procaine, or dibucaine.

Four chemists collaborated in research on the new compound at the Smith, Kline & French Laboratories in Philadelphia: Drs. James W. Wilson, Glenn E. Ullyot, Norman D. Dawson and Walter Brooks.

The new drugs that cause prolonged drop in blood pressure were discovered by another chemical group. They were impurities in synthetic chemicals that were spotted as blood-pressure depressants during routine tests.

If the new drugs prove satisfactory for use on human patients, they may be valuable for periodic treatment of hypertension or for reduction of dangerously elevated blood pressure in preparation for surgical operations. Very small doses in dogs cause a fall in blood pressure that lasts for as much as two hours. These new depressors are comparable in potency to the most powerful known drugs.

The work was done by Drs. Richard Baltzly and Edwin J. de Beer of Wellcome.

Laboratories, Tuckahoe, N. Y., Dr. Johannes S. Buck of Sterling-Winthrop Research Institute, Rensselaer, N. Y., and Dr. Fred-

erick J. Webb of Firestone Tire and Rubber Co., Akron, O.

Science News Letter, September 11, 1948

GENERAL SCIENCE

Research Center in Congo

A \$9,000,000 institute for scientific work will study human, animal, and vegetable life in the Belgian Congo. Research in field has already begun.

► THE CREATION in the Belgian Congo of a new \$9,000,000 institute for general scientific research was announced in a preliminary report released through Dr. Harlow Shapley, Director of the Harvard College Observatory.

It will be open to the scientists from all parts of the world and it will specialize on problems of the tropics. Its initial endowment of \$9,000,000 will be supplemented by an annual subsidy of more than half a million dollars.

The international character of the new institute is emphasized through the appointment by the Belgian government of Dr. Shapley, Dr. E. B. Worthington, British biologist, and Prof. A. Chevalier, French botanist, to the Board of Administrators. The director of the new scientific foundation is Dr. Louis van den Berghe, Professor at the Institute of Tropical Medicine in Antwerp and Visiting Professor of Tropical Medicine at Tulane University.

The purpose of IRSAC (Institut pour la Recherche Scientifique en Afrique Centrale), according to a statement submitted by Dr. van den Berghe, is the fundamental study of the tropical environment, human, zoological, and botanical.

Several research stations will be erected in the Congo during the next two years. The main one will probably be on the high plateau region between Lake Kivu and Lake Tanganyika. A second station will be erected before the end of this year in the Province of the Equator, not far from the mouth of the Congo. A third will be in southeastern Katanga. Two additional stations, one in the east and another in the west, are planned for seismologic and ionospheric measurements.

Field work has been started already on social and physical anthropology, climatology, nutrition, hydrobiology, geology, plant and animal ecology. A party is in the field searching for a most suitable site for a high altitude astronomical observatory.

IRSAC will provide fellowships and subsidies to the scientists for work in the Congo, Dr. Shapley explained. Its aim is to coordinate and inspire the various scientific institutions and services in the Congo. It will also have its own scientific and technical staff, and will act as an agency of information for visiting scientists to the Congo and provide them with material help and various facilities for their explorations and researches. Work tables and other

facilities will be kept at the disposal of Belgian and foreign scientific institutions in the different stations of IRSAC.

The institution will assemble an important and appropriate library at its main station. American scientific institutions able to contribute current and past publications to the library are being asked to address them to IRSAC, Costermansville, Belgian Congo.

Dr. van den Berghe, director of IRSAC, is already established at Costermansville, on Lake Kivu in the high mountainous region of the Eastern Congo. In 1946 he was for three months a Visiting Lecturer with the Harvard Medical School. In 1935 he had been an Advanced Fellow at Harvard under the Belgian-American Foundation.

The Belgian Congo offers much virgin territory for explorations by scientists and affords also a wide variety of conditions, varying from equatorial jungles to mountains that rise above the tree line. On the high plateaus in the regions of the great lakes and the Kivu Mountains, Europeans can live with comfort, even though but a few degrees south of the equator. Around Lake Kivu there are extensive agriculture developments, with coffee, grain, pyrethrum, and cotton among the products.

The Belgian Congo is especially suited to new researches in anthropology. Among the native tribes of the region are the pygmies, as well as the "giants" that live east of Lake Kivu, near Tanganyika.

The Congo is famous for its radium deposits, and it is one of the most important sources of uranium ores.

The president of the board of administrators of IRSAC is Prof. E. deBruyne of the University of Ghent. He was formerly Minister of Colonies in the Belgian Government. Among the administrators are many of the most distinguished scientists and educators of Belgium, representing among other fields, geology, biochemistry, astronomy, mining, engineering, ethnology, sociology, veterinary medicine, physics, agronomy and paleontology.

Although no scientific journal will be maintained by IRSAC, a scientific report, with abstracts of the papers published elsewhere by the members and guests of IRSAC, will appear annually and will be distributed widely among scientific institutions of the world.

Science News Letter, September 11, 1948



ELECTRONIC BALL PARK—This is a "photoelectric tube" designed to measure the speed of electrons knocked loose from an element of invisible ultraviolet light. Using a beam of ultraviolet light as a "bat," General Electric scientists knock electrons from an element suspended in the sphere's center, and measure the speed with which they hit the "outfield," the sphere's inner surface. As few as 6,000 electrons per second can be detected hitting the "outfield."

PLANT PHYSIOLOGY

2,4-D Makes Roots Grow From Leaves of Bean Plant

► A WEED-KILLING CHEMICAL can make roots grow out of garden beans, from a part of the bean which usually produces leaves instead of roots.

The weed-killer, 2,4-D, can cause roots to grow from the infant leaves inside the bean, Ernest K. Akamine of the University of Hawaii reports in the journal, *SCIENCE* (Aug. 27). He believes that this is the first reported instance of such growth.

The cotyledon part in the bean that forms the first leaves on the plant, may survive the effect of 2,4-D which kills the rest of the bean. When it does it puts out roots. However, when the rooted cotyledon is transferred to normal soil without any 2,4-D in it, no shoots develop.

Experiments in which beans were put in glass dishes instead of in soil showed that many different concentrations of 2,4-D will make roots grow from the cotyledon. Only one case was found of a cotyledon which sprouted roots without 2,4-D.

Previous research has shown that 2,4-D can also produce unusual root growths in corn,

Science News Letter, September 11, 1948

CHEMISTRY

**Fluorine-Chlorine Plastic
Very Inert to Chemicals**

► FLUORINE AND CHLORINE make up by weight four-fifths of a new plastic which is an unusually stable, high-temperature material of the thermoplastic type, extremely resistant to chemical action. It is not brittle although strong and hard, and while particularly suitable for use at relatively high temperatures, gives satisfactory performance at low temperatures.

The new plastic is chemically a polymer of trifluorochloroethylene. That is, it is a form of this chemical in which many molecules are linked together to form giant molecules. It is a product of the M. W. Kellogg Company, and will be known as Kel-F. Commercial production is yet only in limited quantities. It was developed by Kellogg scientists in consultation with Dr. W. T. Miller of Cornell University who was the leader in the early work on the reactions of this fluorine-chlorine-ethylene chemical.

Kel-F is closely related to the interesting new family of organic compounds known as the fluorocarbons. In it, however, some of the fluorine is replaced by chlorine. Fluorocarbons are similar in structure to the hydrocarbons of petroleum, but differ in that all of the hydrogen is replaced by fluorine. The hydrogen is the point of chemical attack in the hydrocarbons. The absence of hydrogen gives the fluorocarbons, and Kel-F, extraordinary chemical inertness.

Science News Letter, September 11, 1948

PUBLIC HEALTH

**Ten-Year Health Program
Revealed by Government**

► THE administration has just unfolded a ten-year national health program under which the federal, state and local governments would spend \$4,107,000,000 a year—more than twice current outlays—on health services by 1960.

The program set forth nine basic goals as targets for 1960 in a campaign "to promote the highest possible level of national health."

At the core of the program was a system of national health insurance which was not covered by the cost estimates. President Truman has urged a health insurance program in the past but opposition in Congress and the medical profession has blocked action.

Federal Security Administrator, Oscar V. Ewing, submitted the program to Mr. Truman in a printed report of 186 pages. It was prepared in response to a request made by the President last Jan. 30.

The report listed these basic goals:

1. Increasing the annual output of "medical manpower" by 40 to 50% in 1960.
2. A national health insurance program to assure that all people have needed health

and medical services.

3. An increase of 600,000 in hospital beds (now 900,000) by 1960 and a doubling of the present number within 15 years and the building of new health centers.

4. Federal help to establish adequate local health units "everywhere" and to set up citizen health councils in every state and community.

5. A federal non-military medical research program costing \$80,000,000 to \$100,000,000 a year by 1960.

6. Focusing attention on mental health.

7. Increased research in and control of chronic diseases to insure better adult health.

8. Rehabilitation services for 250,000 disabled persons.

9. Assuring the "utmost degree of health" for every child.

Mr. Ewing estimated that the proposed program would cost the federal government \$2,312,000,000 and state and local units \$1,795,000,000 in 1960, a total of \$4,107,000,000. The comparable total for last year was \$1,962,000,000.

Those estimates did not include the proposed health insurance program, which presumably would be financed from payroll taxes.

Science News Letter, September 11, 1948

ENGINEERING

**Giant Mars Flying Boat Is
Valuable Navy Cargo Ship**

► CAROLINE MARS is now the name of the largest flying boat in active service. Details of this 82.5-ton giant were revealed by the Glenn L. Martin Company, its designer and builder. It is the Navy's JRM-2, which can carry a payload of 35,000 pounds.

This giant flying boat was delivered to the Navy a year ago and since has been undergoing rigorous flight testing and experimental work. Its first long-distance non-stop flight was made this summer in a trip from the Naval Air Station, Patuxent River, Md., to Alameda, Calif. Since then it has been flown to Honolulu, and from there made a notable flight to Chicago to receive its new name.

The Caroline Mars is powered with four Pratt and Whitney engines, each of which develop 3,000 horsepower for take-off and landing. Each engine operates a four-bladed Curtiss electric propeller nearly 17 feet long. The boat has a cruising speed of 173 miles an hour with a maximum speed of 238 miles.

This airship is now joining forces with four other Mars in the 72.5-ton class. They are the Marshall, the Marianas, the Philippines and the Hawaii Mars. All are in use carrying cargo on Pacific routes. All are "descendants" of the original giant Mars that made many round trips between California and Hawaii carrying supplies to American service men during the last year of the war.

Science News Letter, September 11, 1948



MEDICINE

**Drug Reaction Causes
Paralysis of Vocal Cord**

► SENSITIVITY to the antibiotic, streptomycin, has taken many forms in different patients. A doctor in Los Angeles reported the case of a woman who developed paralysis of the left vocal cord after treatment with the drug.

This woman was treated for pain in her back at the Queen of the Angels Hospital, Dr. Lawrence K. Gundrum said in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 4). Following treatment for the condition she received injections of streptomycin and penicillin in her muscles. In about two weeks she noticed a lump in her throat and had difficulty in swallowing liquids.

Gradually she became worse and hoarseness developed. Examination showed complete paralysis of the left vocal cord. Although tests for sensitivity to streptomycin were negative, Dr. Gundrum feels that the nerve injury was probably caused by sensitivity to the drug.

Science News Letter, September 11, 1948

DENTISTRY

**Majority of Toothbrushes
Found Defective by Survey**

► MOST Americans are pretty faithful about brushing their teeth but they neglect their toothbrushes. This was discovered in a survey reported in the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (Sept.).

Four out of five of the toothbrushes now in use in American families were found to be so badly worn or in such an unsanitary condition that they were no longer useful for oral hygiene, two Chicago dentists, Drs. Allen O. Gruebbel and J. M. Wisan, found.

A group of 1,929 families were selected as representing a cross section of the American public. They submitted 8,176 toothbrushes. Of these, 1,580 were found to be in satisfactory condition, while 6,596 were found unsuitable because of bent and broken bristles, matted bristles, unsanitary condition or a combination of these conditions.

It is evident from the study, the dentists concluded, that few Americans follow the oral hygiene practices recommended by dentists.

"The remedy for this situation can be found only in an aggressive campaign to inform every individual of the value of the frequent use and renewal of the toothbrush," they declared.

Science News Letter, September 11, 1948

THE FIELDS

PHYSICS

World's Most Powerful Linear Accelerator Planned

➤ A GIGANTIC ATOM SMASHER, hurling electrons with a billion volts of energy, will be built by Stanford University within the next three years, financed by the Office of Naval Research.

This new machine will be the world's most powerful linear accelerator, a high voltage apparatus that works on a principle different from the cyclotrons, now largest of the atom smashers.

Instead of speeding heavy atomic particles in a merry-go-round whirl as in the cyclotron, the linear accelerator shoots electrons in a straight line, giving them a dizzy ride down the tube on the crest of radio microwaves, such as used in radar (See SNL, July 20, 1946; Oct. 4, 1947).

Dr. William W. Hansen, director of the Stanford Microwave Laboratory, who will direct the building of the 160-foot accelerator, was co-inventor of the klystron, important in wartime microwave radar.

A 12-foot pilot model of the accelerator has already produced electrons of 6,000,000 volts.

Experiments upon the fundamental nature of matter and creation of artificial cosmic rays are possibilities through use of the billion electron volt energies to be reached by the new accelerator. Dr. Hansen believes that it may be possible to create protons and neutrons, the components of the atomic nucleus, through the use of such high energies.

Largest atom smasher operating now is 184-inch cyclotron at the University of California whose 400,000,000 electron volt particles recently produced for the first time man-made mesons (fleeing atomic particles in cosmic rays).

Two large cyclotrons, financed by the Atomic Energy Commission, one of 10,000,000,000 electron volts at the University of California, and another of 3,000,000,000 at Brookhaven National Laboratory, were announced earlier this year (See SNL, May 8, p. 291).

Science News Letter, September 11, 1948

GEOLOGY

Scientists Certain World Is Not Going To Tip Over

➤ SCIENTISTS are not worried about the world tipping over—physically and literally, at least.

A publicized theory suggests that the weight of the Antarctic ice cap may be enough to roll the world over. Such a drastic event would presumably flood most of the lands of the earth. To prevent this,

it is proposed that atomic bombs be used to break up the ice at the South Pole.

But the scientists who study the development of the earth are not concerned. U. S. Geological Survey scientists doubt that any existing polar ice masses are capable of tipping over the globe. One argument against it, they explain, is this:

During the Ice Age, much greater quantities of ice were found at the North Pole than are now found on the earth. It is known that this ice did not tip over the world.

Even if there were such a threat, some scientists pointed out, atomic bombings would not make much of a dent in the ice.

Science News Letter, September 11, 1948

ASTRONOMY

Seventh New Comet Of Year Is Found

➤ ANOTHER NEW COMET, the seventh to be discovered so far this year, has been found in the constellation of Aquarius, the water carrier.

Of the 12th magnitude and thus far too faint to be seen without the aid of a good telescope, comet Ashbrook was spotted at Lowell Observatory of Flagstaff, Ariz., according to Dr. V. M. Slipher, its director. News of its discovery has just reached Harvard College Observatory, clearing house for such astronomical information in the western hemisphere.

The comet, which has a relatively short tail, was discovered by Joseph Ashbrook of Yale University Observatory, who was visiting at Lowell Observatory. It is heading southeast, moving fairly slowly.

When discovered Aug. 26, the comet's right ascension was 23 hours, 11.9 minutes; its declination minus 14 degrees, 50 minutes. Its daily motion was minus 49 seconds in right ascension; minus two minutes in declination.

Science News Letter, September 11, 1948

CHEMISTRY

Lack of Plant Nutrients May Bring Crop Failures

➤ WIDESPREAD crop failures are a danger in the future unless American farmers feed their plants manganese, copper, boron and zinc as well as the conventional nitrogen, phosphorus and potassium fertilizers.

America's high crop yields are removing from the soil plant nutrients needed in small but essential quantity, George H. Serviss, Ithaca, N. Y., chemist, told the American Chemical Society.

While farmers are fertilizing their fields heavier and heavier with relatively pure salts of the three basic fertilizers, nitrogen, phosphoric acid and potassium, they are not replacing in most cases the chemical elements needed in small amount that large crops remove from the land.

Science News Letter, September 11, 1948

BIOCHEMISTRY

Protein Building Blocks As Good Food as Protein

➤ PROOF that the building blocks of proteins (most familiar to you in meat) are just as valuable as food as the protein itself has been obtained by experiments reported to the American Chemical Society meeting in Washington.

Dr. Erwin Brand of Columbia University and Dr. David K. Bosshardt of Sharp and Dohme, Glenolden, Pa., showed in tests on mice that it made no difference whether the protein fed them was a natural one extracted from milk or a mixture of the natural amino acids of which it is composed chemically. The protein used was crystalline beta-lactoglobulin, extracted from fresh milk.

Although this research has no immediate application to actual food problems directly, it is considered fundamental in understanding how food is used by the body. It was financed by the Navy's Office of Naval Research.

Science News Letter, September 11, 1948

MEDICINE

Needless "Shots" Will Eliminate Pain of Jab

➤ THE PAINFUL JAB of the hypodermic needle will soon become obsolete. Commercial introduction some time next year of a jet method of spraying medicines into the body by a very fine stream under high pressure, was promised in a report to the American Chemical Society.

Thousands of injections by the new needless "hypospray" method have shown it therapeutically effective, Dr. James M. McKibbin and Robert P. Scherer of the R. P. Scherer Corporation, Detroit, declared. Changes suggested by the clinical investigators are being incorporated in the commercial production.

Diabetics who have to take injections of insulin daily are expected to benefit from the new almost painless injections.

The new device forces medicine through the skin in so thin a stream that it causes only slight pain, a mild prickling sensation or no pain at all. The hole through which medicine is forced into the body measures only three-thousandths of an inch, about the size of an average human hair or a mosquito's stinger. As a result scarcely any pain fibers in the skin are stimulated.

Since the medicine never comes in contact with moving parts, there is no need for repeated sterilization. Hazards of dull needles and infection are eliminated.

Material to be injected is put in a new-type metal ampule and a spring-activated plunger exerts the pressure for the spray.

Doctors expect it to be helpful in giving immunizing injections to children who create scenes because of the pain of the usual hypos.

Science News Letter, September 11, 1948

NUCLEAR PHYSICS

Atomic Power Production

Large scale atomic plants will not be operating for 20 years or more. Many problems must be solved first. At present, bomb has first place.

By WATSON DAVIS

➤ **PRACTICAL POWER** from the atom, competing with present energy sources, promises to require more time, research and money than the achievement of the atomic bomb itself.

The best guess being made these days is that power on any large scale from fission of uranium and thorium is at least 20 years and possibly 30 or even 40 years in the future.

The first operating nuclear energy plant for power will probably be designed for use in a naval ship that could make long voyages without refueling. And it may take to sea five to 10 years from now before it is publicly announced.

Admittedly less sanguine than they were two years ago, scientists and engineers are nevertheless convinced that useful nuclear power reactors can and will be built, just as the atomic bomb was made a reality.

Heat is being obtained from the conversion of atomic mass into energy, but it is not useful as power. The temperature of the Columbia river is raised several degrees by the heat given off from the Hanford, Wash., atomic furnaces in which plutonium for bombs is manufactured. All the other nuclear reactors, less than a dozen of which are in existence, produce heat which is wasted in cooling them.

Brookhaven Pile

About the end of next year some power will be obtained from the research atomic pile under construction at Brookhaven, Long Island. But this reactor is not built for power and it may produce only about half enough power to operate the pumps and blowers necessary to run it.

There is really no atomic power program being undertaken vigorously today.

About a year ago the Daniels power pile at Oak Ridge was abandoned after several hundred thousands of dollars had been spent on it and a dozen industrial companies and government agencies had worked together on it. General Electric has a program aimed at eventual power production, but little is known about when that power reactor will get started.

Diversion of men, skill and money to atomic power production is being postponed now for two primary reasons:

1. Actual bomb production is being given priority in the non-research activities of the Atomic Energy Commission.

2. Non-military expenditures are being concentrated on new giant cyclotrons and

other long-range attacks upon the frontiers of physical knowledge out of which may come new and important developments.

An array of difficulties beset atomic power production.

The heat handled is much higher than in conventional coal-fired power plants, probably in the range of 1,800 to 2,700 degrees Fahrenheit. This means that unusual materials must be used in constructing the nuclear pile. For not only must they withstand high temperatures, but they must not absorb unduly the neutrons that produce the chain reaction of exploding atoms of uranium and plutonium. This rules out conventional steel. There is some possibility that titanium metal would do the trick and could be produced cheaply enough. But as a pure metal it hardly exists at all today. Or a new ceramic (clay) material may be the answer.

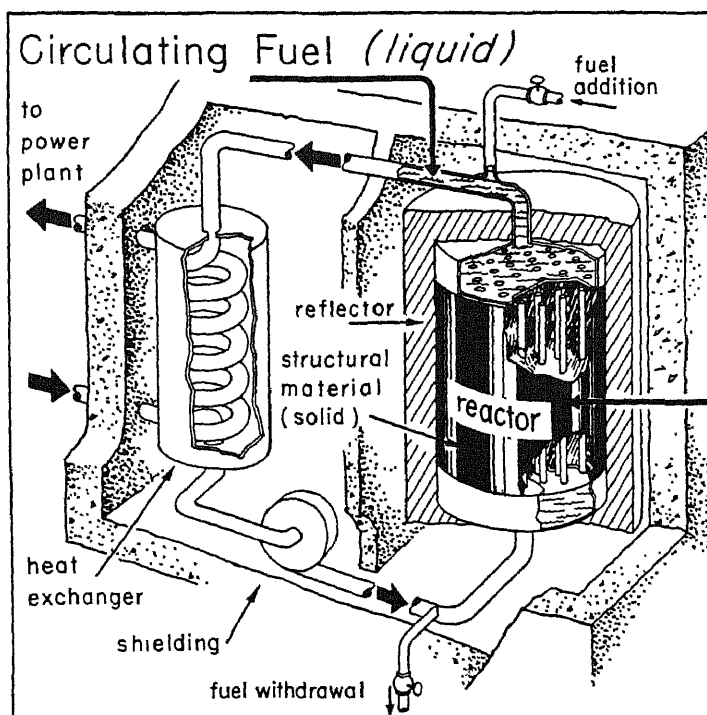
The deadly and intense radiation from nuclear fission must be protected against at all steps in atomic power production. This

means thick shielding of concrete or other radiation-absorbing materials. The liquid picking up the heat in the atomic furnace will be almost as dangerous as the pile itself and the whole system must be leak-proof, which is much to ask because of the damaging effects of radiation upon machinery. Control rods in the pile (controlling the fission reaction) must be operated with great reliability inside the shielding and at the high temperatures. Replacements and repairs of the furnace will be dangerous because of the radiation contamination. Atomic power plants will be like battle-ships subjected to atomic bomb attack that become so "hot" they must be sunk at sea as a safety measure.

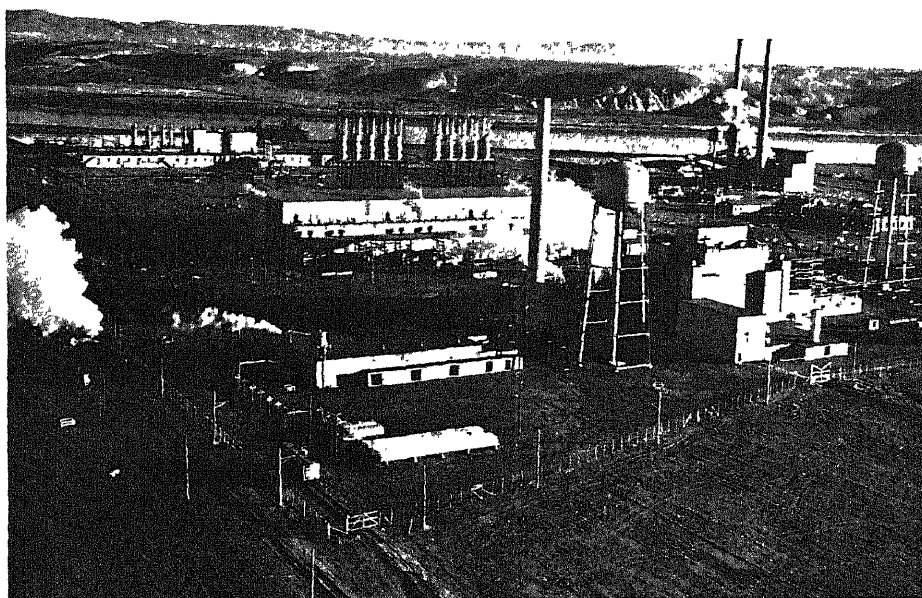
Debris of Fission

The debris of atomic fission, comparable to the ashes of a fire, will tend to quench the nuclear reaction by absorbing neutrons. The changed fuel must be removed periodically and reconcentrated, which means a difficult chemical treatment. Meanwhile the atomic furnace is shut down.

The supply of fuel for the atomic furnace is always a critical matter. There is only a relatively small amount of uranium



POSSIBLE ATOMIC POWER PROCESS—This is a heterogeneous reactor with circulating liquid fuel and structural, solid material as a moderator. Fuel could be ordinary or enriched uranium. The diagram is from *The Science and Engineering of Nuclear Power* (Addison-Wesley Press).



PLUTONIUM PLANT—This element which may play an important role in atomic power as well as atomic bombs is manufactured at the Hanford, Wash., plant of the Atomic Energy Commission. The plant has changed in the three years since this picture was taken, but the AEC has not released any more recent pictures which would reveal changes.

(and thorium from which one kind of fissionable uranium can be manufactured) in the world. Despite the fact that a piece of uranium metal that can be held in one hand would yield the heat equivalent of 2,500 tons of coal, the extraction of the uranium or its conversion into fissionable material is a long and tedious technical task.

Once the technical problems are overcome, what is the competitive cost position of atomic power compared with generating power from conventional fuels? No one can estimate this too closely now.

There is another danger in atomic power plants beyond the technical ones. In the operation of any pile there will be a concentration of uranium from which atomic bombs might be made. In addition, the pile reaction may be just the same as the process

at Hanford where plutonium is made from non-fissionable uranium. So every atomic power plant becomes potentially an atomic bomb material factory, from which there could be bootlegged the materials for illicit atomic bombs. Thus atomic power plants must be controlled if there is to be international or other control of atomic energy.

Some experts feel that time is being lost by lack of a direct construction program for atomic power plants, while others believe that money and time will be saved by collecting additional experimental data and perfection of theory.

Secrecy shields some of the facts needed for judgment as to whether America is doing all that can be done to bring about the new era of atomic power.

Science News Letter, September 11, 1948

ASTRONOMY

Many Man-Made Skies

➤ MANY more people today can observe man-made skies than ever before.

Ten months to a year ago, planetaria existed in only a half dozen communities. Now over 30 different organizations are operating instruments that within a half hour or so show stars visible in the heavens not only that particular night, but through-

out the entire year. Most of the projecting devices and domes in use today are portable so they can be carried to out-of-the-way localities for display.

By far the most effective device yet produced for picturing the motions of the heavens is the Zeiss planetarium, designed by engineers of the firm of Carl Zeiss in

Jena, Germany, at the suggestion of the astronomer Max Wolf. Several such instruments, which cost around \$150,000, are in operation in the United States.

The first was installed at the Adler Planetarium of Chicago, almost two decades ago. More than 3,000,000 visitors attended during its first three years. The Fels Planetarium of the Franklin Institute of Philadelphia opened in 1934. Almost 200,000 visit it each year.

Other Zeiss instruments are operated at the Griffith Planetarium in Los Angeles, the Hayden Planetarium in New York City, and the Buhl Planetarium in Pittsburgh. Stockholm's Zeiss planetarium has been acquired by the University of North Carolina, in Chapel Hill, but will not begin operation for some time.

The clock can be turned back a thousand years or more with a Zeiss planetarium. It is designed to exhibit, with close fidelity, the appearance of the sky at any place on the earth and any time of day or night for many thousands of years. Projectors of sun, moon and planets may be operated independently. The Zeiss works are no longer in existence, and it is unlikely that any more of these instruments will be available.

At the Museum of Natural History in Springfield, Mass., is the Korkosz plane-

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SET NO. 2

Recommended for secondary schools

Maximum-minimum thermometers with support, U. S. Weather Bureau type. Sling psychrometer, USWB, with tables. Aneroid barometer, USWB, inches and millibars. Rain and snow gage, USWB, 8" diameter. Anemometer, electric, with 1/60 mile contacts. Wind vane, electric, with 8 directional contacts. Wind indicator for remote reading. *Instruction books*: "Techniques of Observing the Weather," Haynes; "Basic Principles of Weather Forecasting," Starr. Record form for observations.

Set, complete \$150.00 fob Philadelphia

SET NO. 1

Recommended for primary schools

Maximum-minimum thermometer, Navy type. Hygrometer, fixed wet and dry bulbs. Baroguide, aneroid, with forecast dial. Rain and snow gage, 3" diameter. Wind vane, NESW letters. Instrument shelter for thermometers. *Instruction book*: "Techniques of Observing the Weather," Haynes. Set of U. S. Weather Bureau pamphlets. Record forms for observations.

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SCIENCE ASSOCIATES

"Everything for the study and practice of meteorology"

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Do You Know?

Milk contains 14 times as much *calcium* as the blood of the cow.

Waste from the process of canning *pears* is suitable for growing high-protein, high-vitamin yeast for use in poultry feed.

The parent stock for most of the improved hybrid commercial varieties of *sugarcane* has come, in recent years, from a U. S. Department of Agriculture nursery.

Cocona, a desirable new fruit for the humid tropics, is said to be delicious in preserves, pies and sauces; it has been called a "jungle apple" and a "peach tomato."

To improve the curing of coarse-stemmed *hay*, some farmers use what is known as a mower-crusher; this cuts the hay in the usual manner and then passes it through crushing rolls which crack the stems.

Super *service stations* for private planes are promised; they will be built at flying fields and will provide fuel, oil, and minor repairs, and also rest rooms and a chart room with maps and other navigation plotting facilities.

Between Jan. 5 and May 12, 1948, 211 floating Japanese *mines* were spotted in the Pacific, including 113 within the 50-mile limit of the American continental coast; 69 were destroyed by American agencies within the 50-mile limit, and 74 outside.

Telephone Shoulder Cradle

Leaves both hands free while using phone.

Can be installed in two minutes.



Tele-Rest shoulder cradle gives phone users complete freedom of both hands. Fits any portable phone. Compact, unbreakable, adjustable.

A convenient phone accessory for executives, order clerks, secretaries, professional people and housewives. When the telephone is placed to the ear, the cradle rests comfortably on the shoulder, permitting the user to take dictation, write notes, check files or search for reference material. Tele-Rest is made of cast aluminum with rubber shoulder grip. Adaptable for either ear. (Add postage foreign orders)

\$1.98

JOHN N. CULVER

4007 Lawrence Street Colmar Manor
Brentwood, Maryland

tarium, an elaborate home-made device that projects the stars upon the inner surface of a dome, as does the Zeiss planetarium, but without representing the planets. Special "twinkling" effects add reality to the projected star images. This was opened to the public in 1937.

A new portable planetarium, simple in design and operation, has proved highly popular. First shown at Harvard late last year, more than 20 Spitz planetaria can be found from coast to coast. Developed by Dr. Armand N. Spitz, educational director of the Franklin Institute, some are used in schools and colleges, some in public museums and observatories, and one is employed in government research.

Costing but a fraction as much as the Zeiss, these sell for \$720 each; home-made

domes are often used with them. Attachments are available to show coordinates, eclipses of sun and moon, comets, meteors and other astronomical phenomena.

A number of other, simpler devices are also used for indoor study of the heavens. Some are electrically operated, others are turned by hand to show how the skies change during a night or season.

One consists of a frosted globe left unpainted where light to represent the stars can shine through. Another is simply a series of cards with holes punched in them. All these devices acquaint amateurs with changes in the heavens, and teach them to recognize outstanding stars and constellations when the heavens shine in all their glory.

Science News Letter, September 11, 1948

GENERAL SCIENCE

Textiles Would Aid Japs

➤ **REBUILDING** the textile industry in Japan is a number one problem in the economic recovery of the country, according to the U. S. Department of State. The labor that constructed wartime equipment should now go back to peacetime fabrics.

Twenty years ago, textiles accounted for 40% of the total value of Japan's factory production and absorbed 52% of all industrial labor. Less than a decade later more than one-fourth of this labor had been taken over into industries which involved the war-supporting metal, machinery and chemical industries. To become self-supporting, Japan must redevelop its international trade. The basis of this trade is textiles.

International trade is essential for Japan because that country must import many of the raw materials used in industry as well as one-fifth of the food required. The textile industries rely largely on imports: Japan raises practically no cotton or wool, and much of the silk produced in the country was, in prewar years, sent abroad in the raw condition.

The postwar rehabilitation of Japan's textile industry has been a slow process although supported by the Supreme Commander for the Allied Powers and bolstered by about 900,000 bales of American cotton sent to the country by the American Commodity Credit Corporation in 1946-47. Later 350,000 bales were sent.

This was done to help get Japan on its feet with as small an outlay of American money as possible. Stocks of raw cotton and wool were more readily available than other raw materials, and it seemed desirable to promote textile manufacture because it is not a war-supporting industry.

Shortage of raw materials is an important factor in the textile rehabilitation program. Shortages of labor and fuel are other important factors. Machinery is available, although much was destroyed by bombs or scrapped by the Japs to build war equipment. Japan has more machinery in oper-

able condition than is actually in operation, the State Department report asserts. The labor shortage is due in large part to the many former textile workers who moved to rural areas during the wartime bombing, and now seem to prefer to remain there where food is more plentiful.

Science News Letter, September 11, 1948

PHYSICS

Unheard Sound Helps Test Paint, Varnish

➤ **SOUND TOO SHRILL** to be heard by human ears can now tell whether a paint or varnish will wear well. It can do it in less than a second.

This modern test to tell whether a synthetic coating will peel before it should was reported to the American Chemical Society meeting by Saul Moses of the Naval Research Laboratory, Washington.

The coating is smeared on metal which is then shaken violently electronically by a device that generates high frequency sound waves. The force of vibration needed to make the paint or varnish peel indicates how long it can be expected to last under normal conditions of wear.

Science News Letter, September 11, 1948

SCIENCE FILMSTRIPS

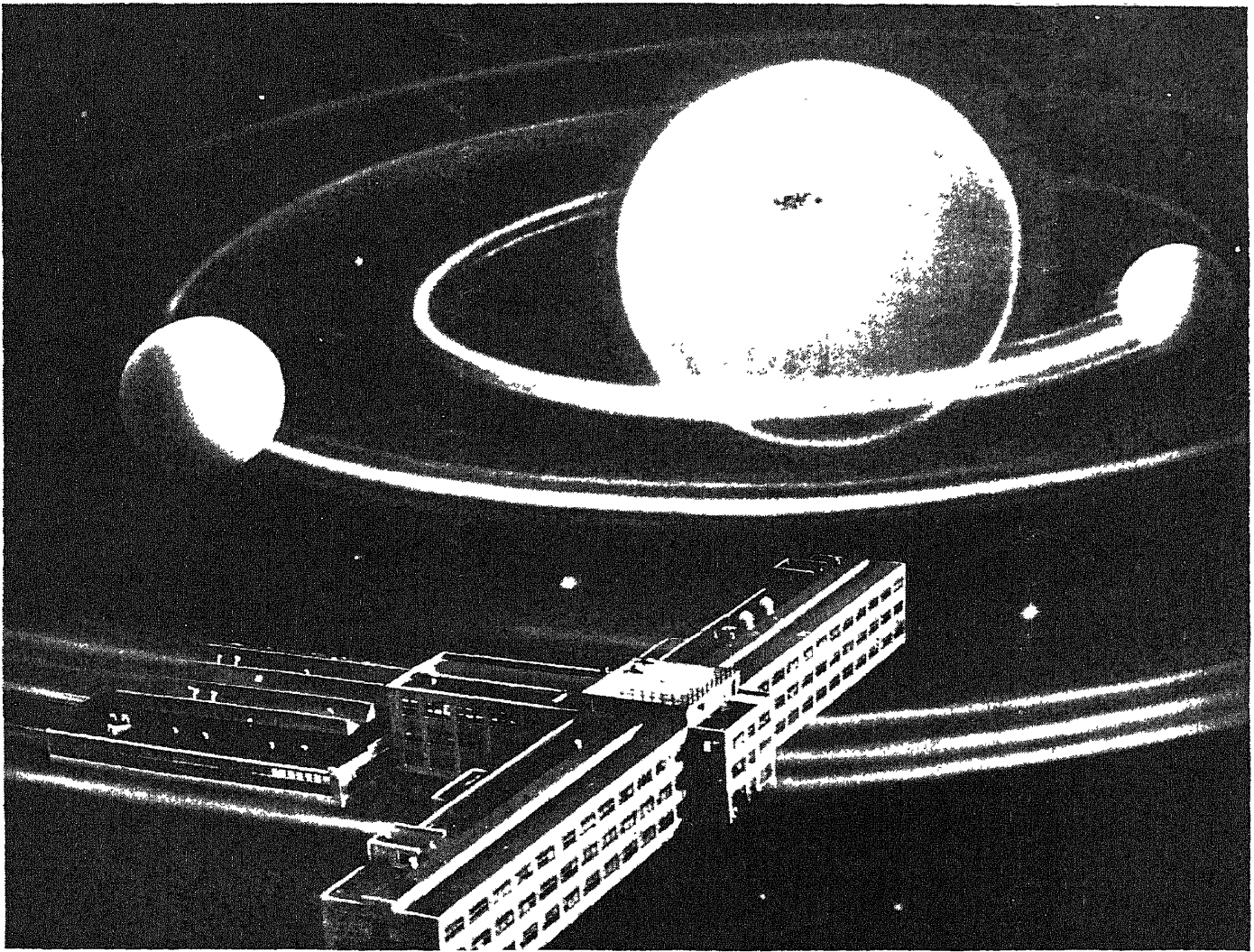
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VISUAL SCIENCES

599-S

SUFFERN, N. Y.



"Sunspot" research, by RCA engineers, helps radio communications to dodge interference from magnetic storms. RCA Laboratories is a center of radio and electronic research.

93,000,000 miles of laboratory space

A cyclonic spot erupts on the face of the sun, and—here on earth—we feel it. Sunspots cause "magnetic storms," which disrupt radio communications.

What can be done about it? Research, during which RCA scientists and engineers "worked" by instrument on the sun—93,000,000 miles away—offers an answer.

For many years, science related magnetic storms to sunspots. An accurate way of forecasting these disturbances was needed.

RCA scientists took a new tack. They noted that interference was most intense when sunspots were in a certain "critical area." Location and activity were observed to be more important than size.

Using this knowledge, RCA communications engineers accurately forecast the beginning and end of magnetic storms. They have established a daily magnetic storm forecasting service which is distributed like weather reports throughout the world. Transmission of messages can

be arranged over circuits or paths that will dodge interference.

Such a pioneering spirit in research gives efficiency of service and leadership to all products and services bearing the names RCA, and RCA Victor.

. . .

When in Radio City, New York, you are cordially invited to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. Radio Corporation of America, RCA Building, Radio City, N. Y. 20.



RADIO CORPORATION of AMERICA

CHEMISTRY

Softeners for Plastics

➤ THAT PLASTIC shower curtain in your bathroom gave the chemists a lot of worries as they were perfecting it.

A plastics age story was told by W. A. Woodcock of the Carbide and Carbon Chemicals Corporation, New York, at the American Chemical Society meeting in Washington.

When the first plastic curtains were made about a decade ago, the softening agent used in the plastic evaporated too fast. Result: Curtains too stiff and cracked too easily.

Another plasticizer was used and the portion not wet was pliable but the part in contact with water was still too stiff.

A third softening material turned out to be just right—except it developed an obnoxious odor on the store shelf that discouraged customers.

Finally the present shower curtain of vinyl resin was perfected and proved satisfactory.

Then there is the story of the butchers' plastic aprons, made with an experimental softening agent, tested carefully under the usual conditions of a meat market. But they were shipped during a cold spell and arrived at their destination completely shattered because of brittleness.

Mr. Woodcock told these hard-luck stories in reporting the importance of plasticizers, production of which will reach an all-time high this year of 200,000,000 pounds.

Plastic materials get lots of notice but the softening agents necessary in making them are less well known, although a pound of plasticizer is needed for every two pounds of vinyl plastics.

Idle farm products will furnish both plastics and plasticizers of the future, Dr. C. E. Rehberg of the Department of Agriculture's Eastern Regional Research Laboratory, Philadelphia, told the chemists.

Usually plasticizers of vinyl plastics—used in raincoats, handbags, tobacco

pouches and dozens of other things as well as shower curtains—are derived from petroleum. Dr. Rehberg reported that softening agents can be made with lactic (sour

CHEMISTRY

New Nylon Plant

➤ NYLON is now ten years old. The hundreds of applications that have been found for this versatile plastic, ranging from women's hosiery to paint brush bristles, are responsible for a giant manufacturing plant near Parkersburg, W. Va., now completed, which will be in production this fall.

The plant will manufacture the nylon molding powders which other manufacturers will use in making finished products. It will make plastic Lucite and polythene molding powders as well. It has been constructed by the Du Pont Company, in whose laboratories nylon was discovered. It contains 17 buildings on a 400-acre tract of land which once belonged to George Washington.

The discovery of nylon about ten years ago was accidental in the sense that it came from a research project whose primary purpose was to acquire knowledge of the mechanism for making large organic molecules. Nature does this in building the structural materials of cotton and silk. The fact that from the program came a whole range of new products is a convincing argument for time and money spent in fundamental research without reference to commercial applications.

The first commercial use of nylon was in bristles for toothbrushes and hairbrushes. Very soon, however, a spectacular discovery was made. It could be used to make stockings for women, a rival of imported silk. But nearly the entire product was drafted by the war. War uses ranged from parachute material to naval rope to supplement the short supply of Manila hemp.

The name nylon does not refer to a single substance, but to a family of related substances. Nylons are chemically similar and have the common ability to be formed into textile fiber. But nylon in the form of powders can be molded into many useful objects. It is one of the so-called thermoplastics. It can be softened by heat and re-hardened again by chilling. Nylon, however, is a type of thermoplastic that does not noticeably soften at the temperature of boiling water. This fact makes it usable in many applications which would not otherwise be possible.

Lucite is a trade name for a sparkling, crystal-like acrylic resin. Lucite molding powders will be made in Parkersburg. They will be available to other manufacturers to make transparent enclosures for aircraft,

milk) acid, which can be produced from potatoes, molasses, and sulfite waste liquor from paper making. Other chemicals required can be made from agricultural wastes such as corn cobs.

In this way farms can relieve the oil wells of America in furnishing necessary raw materials.

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stormwindow panes, doorknobs, brush backs, household utensils, wrapping material, and many other articles. Polythene is an excellent electrical insulator, but has many other uses.

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ENGINEERING

Thickened Fuel Speeds Steam Forming in Boilers

➤ THICKENED FUEL, a wartime stuff for flame throwers and bombs to start fires in enemy strongholds, is replacing wood and coal kindling to start fires in giant industrial boilers. It is a time saver and a fuel saver.

Speed is its particular advantage. It will bring stoker-fed industrial boilers to full operating steam pressure in 30 minutes, compared with the eight hours usually required by the older type kindling. This means not only time saving but also substantial savings in coal consumption.

The thickened fuel has now been thoroughly tested in boiler firing, Esso Standard Oil Company revealed. It is made of diesel oil containing aluminum soap which makes it a semi-fluid, jelly-like mass that can be applied in nests along the boiler grate well in advance of use, and ignited with a paper torch.

It clings to the coal, burns slowly and with sufficient intensity to fire the coal. Its ability to fire the entire furnace evenly contributes to the speed with which steam pressure is obtained. Five gallons of the product are sufficient for a large boiler.

Science News Letter, September 11, 1948

Plastic Coasters and Tiles

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ACCIDENT FACTS—*National Safety Council*, 96 p., illus., paper, 50 cents. Important information about the cause and prevention of accidents.

AFTER-DINNER SCIENCE—Kenneth M. Swezey—*McGraw-Hill*, 182 p., illus., \$3.00. A book of cute tricks and experiments that you can try out, if not at the dinner table, certainly in the kitchen. Each is clearly shown in photographs.

THE AMATEUR PHOTOGRAPHER'S HANDBOOK—Aaron Sussman—*Crowell*, 3d ed., 399 p., illus., \$3.75. If you are a snaphooter or have advanced to more serious work, you will find much helpful information in this liberally illustrated (with photographs, of course) work.

THE ANTHRACITE FOREST REGION, A PROBLEM AREA—Frank A. Ineson and Miles J. Ferree—*Govt. Printing Office*, 71 p., illus., paper, 40 cents. A U. S. Department of Agriculture publication recommending action to relieve the situation of chronic unemployment in this coal-mine-forest region.

ATOMIC ENERGY: Being the Norman Wait Harris Lectures Delivered at Northwestern University—Karl K. Darrow—*Wiley*, 80 p., illus., \$2.00. Prepared for laymen because, as the author says, "Ignorance is not safe when the unknown may not be friendly; and since we discovered that matter is not invariably stable, the known has become so awesome as to suggest that the unknown can be unfriendly."

CLIMATIC ACCIDENTS IN LANDSCAPE MAKING—C. A. Cotton—*Wiley*, 2d printing, 354 p., illus., \$7.00. Describing interesting features in the face of the earth caused by accidents which interrupt the normal development of land formation.

THE CRIMINAL AND HIS VICTIM: Studies in the Sociobiology of Crime—Hans von Hentig—*Yale University Press*, 457 p., \$6.00. Tracing interesting relations between various types of crime and hereditary factors, social conditions and other elements. Even the time of day influences certain crimes. The victim too has his responsibility.

THE FEEDING ORGANS OF ARACHNIDA INCLUDING MITES AND TICKS—R. E. Snodgrass—*Smithsonian Institution*, 93 p., illus., paper, 90 cents.

HANDBOOK OF ELEMENTARY TECHNICAL MATHEMATICS—John W. Greenwood and M. Irving Chriswell—*Prentice-Hall*, 186 p., illus., \$2.80. A high-school text in preparation for technical studies.

MEETING NEEDS OF MANKIND BY SCIENTIFIC RESEARCH: EXPERIENCE AND ACTIVITIES OF MELLON INSTITUTE: The Thirty-Fifth Annual Report of the Director, E. R. Weidlein, to the Board of Trustees of the Institution, for the Fiscal Year Ended February 29, 1948—*Mellon Institute*, 44 p., illus., paper, free upon request direct to Mellon Institute.

A READER IN GENERAL ANTHROPOLOGY—Carleton S. Coon—*Holt*, 624 p., illus., \$5.00. Selections from important works for the benefit of the anthropology student.

THE RESCUE OF SCIENCE AND LEARNING: The Story of the Emergency Committee in Aid of Displaced Foreign Scholars—Stephen Dug-

gan and Betty Drury—*Macmillan*, 214 p., \$3.00. The story, partly first-hand accounts by the scholars, of what they did in this country, what they accomplished and their impressions of the people and customs they encountered.

TWENTY-FIRST ANNUAL REPORT OF THE COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH FOR THE YEAR ENDED 30TH JUNE, 1947—*Commonwealth of Australia*, 139 p., paper, \$1.00 approx. Reporting researches in various fields of science and agricultural investigation.

YANKEE SCIENCE IN THE MAKING—Dirk J. Struik—*Little, Brown*, 430 p., \$5.00. Science in the United States has its roots in the beginnings of the nation itself and has grown up along with it. This is a story of the early days in New England.

YOUR DIET FOR LONGER LIFE—James A. Tobey—*Wilfred Funk*, 280 p., \$3.50. Telling the general reader what he wants to know, as indicated by more than 100,000 letters of inquiry.

ZINSSER'S TEXTBOOK OF BACTERIOLOGY: The Application of Bacteriology and Immunology to the Diagnosis, Specific Therapy and Prevention of Infectious Diseases for Students and Practitioners of Medicine and Public Health—Revised by David T. Smith and others—*Appleton*, 9th ed., 992 p., illus., \$10.00. An authoritative text brought up to date with an expansion of part on sulfonamides and a new section on antibiotics.

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MEDICINE

Powdered Antibiotics Arrest Lung Infections

➤ BEFORE your next operation, you will be inhaling through your mouth finely powdered penicillin and streptomycin if a method described to doctors in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Sept. 4) comes into use.

The inhalations will foil germs lurking in the lungs which might rise up and infect the lungs following a surgical operation.

Lung infections following major abdominal or chest surgery are a real problem, as they occur in about a fifth of the operations.

In the tests in Rochester, N. Y., only one out of 51 patients who inhaled the penicillin dust developed lung infections, while none of the 40 treated with streptomycin became ill.

The method was developed by Dr. George V. Taplin, at Rochester when the work was done but now at the University of California at Los Angeles, and Drs. Sidney H. Cohen and Earle B. Mahoney of the University of Rochester.

The treatment promises to become particularly important in the northeastern

section of the country where chronic sinus and respiratory diseases are prevalent.

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ARCHAEOLOGY

Australian Ancient Tooth Is Not Human but Animal

➤ FOR NEARLY 80 years, Australians have treasured as evidence of the antiquity of man in their country a supposed human molar tooth.

Found in the Wellington caves of New South Wales, imbedded in rock with prehistoric animal remains, it has been considered belonging to a period of 7,000 to 12,000 years ago.

Now it turns out that it is not evidence of an early Australian man but the tooth of a giant Ice Age wallaby, a kind of kangaroo.

Dr. H. H. Finlayson of the South Australian Museum tells the sad story in a letter to the British journal, *NATURE* (Aug. 14). The tooth is the posterior half of the upper fourth premolar of the right side of a kind of animal whose remains are found in profusion over a wide area of eastern and southeastern Australia.

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⚙️ **SEALING MATERIAL**, to make water-tight joints between built-tubs and tile walls or flooring, is a resin-based caulking that comes in a tube from which it is squeezed out like toothpaste from its container. It is smoothed into place with a tool accompanying the material and forms a white, durable, expanding and contracting joint.

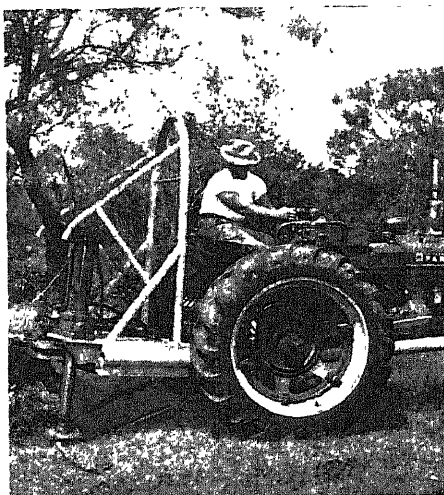
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⚙️ **EYEGLASS CASE**, made of a plastic called polyethylene which is flexible but almost indestructible, can be cleansed inside and out with boiling water if desired and it does not absorb perspiration. Oils, greases, solvents and common chemicals do not harm it.

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⚙️ **ALUMINUM SCREEN** for the automobile radiator front, to keep insects out of the radiator itself, has high heat conductivity which permits rapid dehydration of all insects caught. The remains are swept from the screen by a two-way operating stiff bristle brush controlled from the glove compartment.

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⚙️ **TREE-PULLER**, shown in the picture, is used in connection with a farm tractor and lifts reasonably large trees out of the ground, roots and all. Two powerful jacks, which rest on the ground at the rear, and a pair of gripping jaws are used, the jacks being powered by the tractor engine.

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⚙️ **CABLE REEL**, particularly for heavy electric cable, has tubular steel supports on which it stands and which may be used as sled runners in sliding the reel in or out of trucks. Handles above the reel make it easy to carry; an adjustable brake controls rotation.

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⚙️ **CLEANING BRUSH**, for the insides of bottles and laboratory flasks, has a nylon bristle head which after insertion in the hard-to-reach place can be turned at an angle to the handle by means of a trigger on the handle outside the flask. The trigger controls several springs which permit the hinged movement.

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⚙️ **ELECTRONIC COLOR ANALYZER**, for medical research, color photography and other fields, may play an important part in cancer research because blood changes color during the progress of the disease, it is claimed. It provides for accurate measurements of color densities at single wavelengths as well as black-and-white densities.

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• Nature Ramblings by Frank Thone •

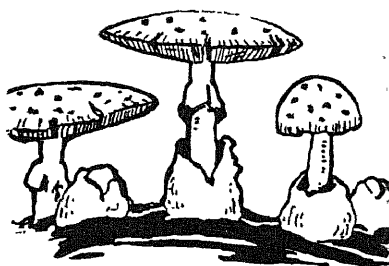
➤ **WARM**, wet weather, prevalent during August over most of this country, should insure an abundance of mushrooms, puffballs and other fleshy fungi in September and October. People who know their mushrooms will rejoice accordingly, and fare forth with their baskets to reap gourmets' harvests at no cost—an accomplishment well worth while in these days of superstratospheric prices.

It is really a pity that so little use is made of our great wealth of wild mushrooms, especially since there are several species among them far superior in flavor to the common field agaric which is the only mushroom cultivated for the market.

There is, for example, the inky-cap tribe, so called because of the readiness with which their mature caps melt down into a fluid mass stained black with their billions of spores. They make just about the best mushroom gravy there is. Biggest and best of this group is the conspicuous, easily recognizable, appropriately named shaggymane mushroom.

Close competitor for flavor, and of solid

Autumn Offerings



flesh in the saucepan, is the morel, a stubby-stalked mushroom with an irregularly furrowed, mostly dark-brown cap that looks rather like a roughly conical bit of synthetic sponge. That it doesn't taste like a sponge is well attested by its common nickname of "beefsteak mushroom."

If you can find a big puffball that is still in a white-cheese-like state of immaturity inside, you have a treat in store—supposing

you can afford to fry anything in butter nowadays. Sliced like eggplant and fried thus, puffball is really good eating. There is a consolation, too, in knowing that there are no poisonous puffballs.

Many persons are afraid of all wild mushrooms because some of them are poisonous. There is good warrant for caution in approaching strangers in the fungus world, but that should not be carried to the point of avoiding all acquaintance. Most state agricultural experiment stations, as well as the larger public museums of natural history, have popular mushroom-recognition pamphlets available for free or low-cost distribution.

It is easy to recognize the one abundant genus of mushrooms that is most dangerous, the amanitas or death-cups. The trademark of the amanita is the ring and the cup. Around the stalk, about half-way up, is a loose ring of fragile mushroom tissue; and at the base of the stalk is a cup, that once covered the young mushroom like an eggshell. If both these characters are present, better let that mushroom alone.

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SEPTEMBER 18, 1948

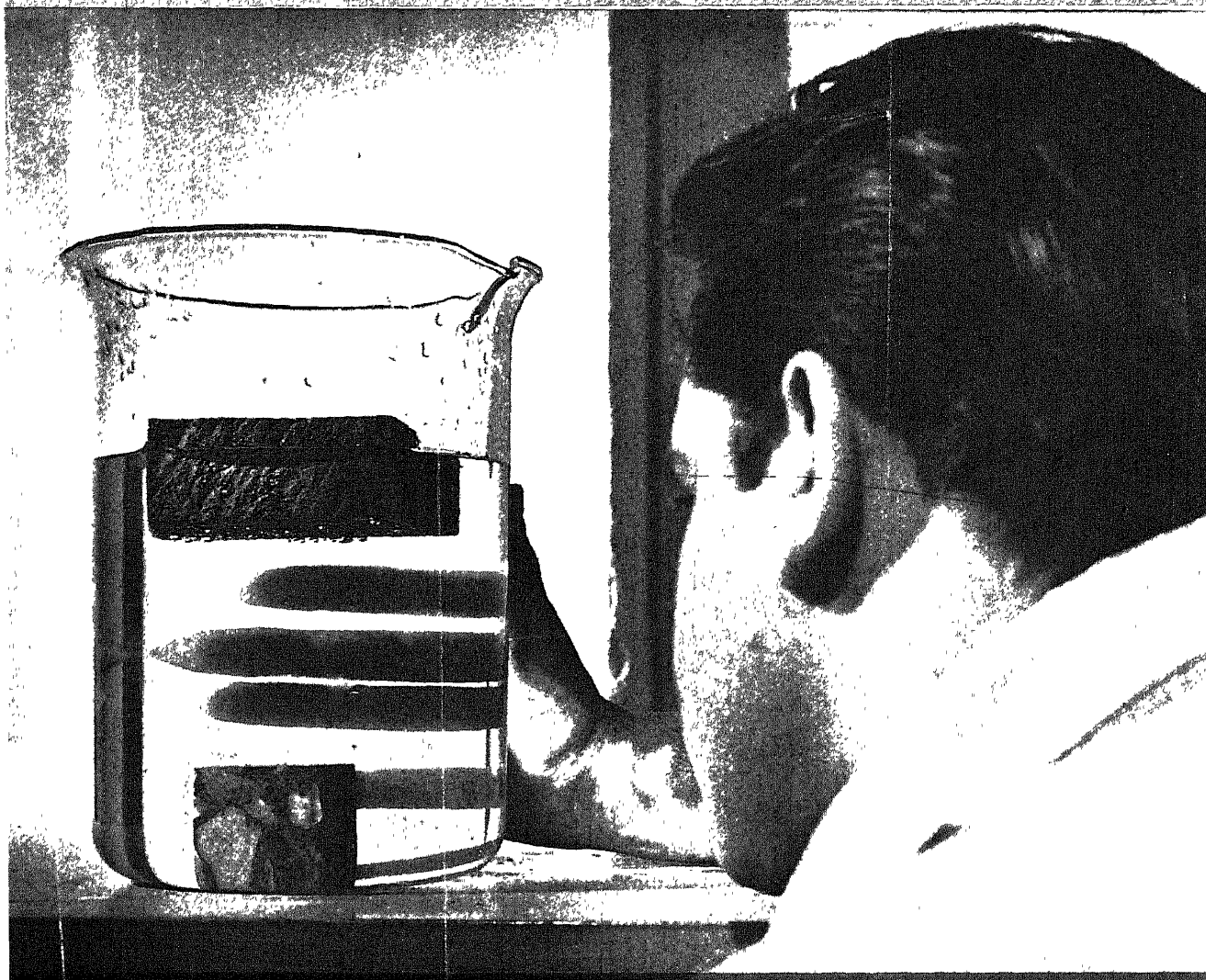
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See Page 186

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ASTRONOMY

Stars Supra-National

Dr. Harlow Shapley, in retiring presidential A.A.A.S. address, says scientists can lead world in cooperation across national boundaries to peace and progress.

➤ SCIENTIFIC cooperation across national boundaries can be used to lead the world into an era of peace and human progress, Dr. Harlow Shapley, director of the Harvard College Observatory, declared in his address as retiring president of the American Association for the Advancement of Science which opened that organization's centennial meeting at Washington (Sept. 13).

Supra-nationalism is "simple and effective" for scientists, Dr. Shapley said, calling upon scientists to show how mankind can survive the present crisis.

An international observatory, a joint enterprise of Eire, the United States and North Ireland, will begin photographing the stars from South Africa a year from now. This will be "symbolic of the willingness and desire to cooperate across religious and political boundaries when led by the stars."

A new wide-angled Baker-Schmidt telescope of great power will be mounted at the Harvard station in the Orange Free State, South Africa, by agreement between Dunsink Observatory of the Eire Government, the Armagh Observatory of the Arch-Bishopric of North Ireland and Harvard.

Science must go to the heavens for information that can not be obtained in earthly laboratories, Dr. Shapley said.

"We can now build and split atoms in our laboratories," Dr. Shapley said, "but there is nothing we can do with the galaxies, those gigantic wheel-shaped star systems, strewn by the millions throughout the recently

discovered outer spaces. Nor can we do anything with the smaller sidereal systems, the beautiful globular clusters, except to study them and learn of their enormous populations of giant stars, measure their times, energies, positions, and motions, guess at their origins and destinies, and bring back to the philosophies and religions the raw materials useful for the reorientation of man and his works in the new world of knowledge and intellectual opportunity.

"These great spiral galaxies are probably similar in form to the one in which we are located. Others are irregular, like the nearby clouds of Magellan, to which we at the Harvard Observatory have paid much attention for the past 50 years. Still other galaxies are spheroidal and symmetrical, looking much like super-giant globular clusters, which indeed they may be."

A month ago about 40 astronomers from a dozen countries, who were particularly interested in the problems of galaxies, met in Zurich, Switzerland, to talk over the problems demanding further study, Dr. Shapley reported.

"There was no jockeying for national prestige, no manipulating of small observatories, no struts about manifest destinies and national aspirations," he said. "It was an assembly of those representing a unified world curiosity, a unified desire to understand the universe, a united front in a special battle against our common enemy, ignorance."

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Many other uses are foreseen for the new method. Because it will enable doctors to determine more precisely the injury to nerves and muscles, they can judge whether a paralysis is caused by nerve injury, muscular disease, or whether it is a result of hysteria.

Besides aiding in disease diagnosis, it can also help in the recovery of patients. Dr. Huddleston pointed out that it is useful in training patients to use their muscles after illnesses. By enabling the patient to see or hear what is happening, he can concentrate on contracting the right muscles during training.

Dr. Huddleston predicted, "The electromyograph will become as important in studying the diseases of the muscles of the body as the electrocardiograph has been in studying the diseases of the heart."

It is also expected to be important in giving legal evidence in actions involving insurance and liability claims.

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PSYCHOLOGY

Reading Courses To Speed "Paper Work" of Air Force

➤ THOUSANDS of Air Force officers will in the future be able to read their way down through their mountains of "paper work" with much greater speed and ease.

The reading of officers in the Air University, Maxwell Air Force Base, Montgomery, Ala., was speeded up by special training from an average of 250 words a minute to approximately 600 words a minute. Dr. Fred Couey, of the Air University, told the meeting of the American Psychological Association in Boston that comprehension remained at the same level.

At first the officers were permitted to volunteer for the reading-speeding training. Thirty were trained in this preliminary program. Later it was required and 115 officers were given the advantage of the increased reading speed. The training was just as effective when it was a "must" as when the men volunteered.

In the coming year, it is planned to put 5,000 officers through the training program.

The training is not time-consuming. The men work only three hours a week. Half of each hourly period is spent at an instrument that exposes slides containing numbers for fractions of a second. The time of "glance" permitted to read the number is cut down from 1/25 second to only 1/100 second. The size of the number, meantime, is increased from five places to nine places.

The other half of the class is more entertaining. Reading material is selected from the most interesting of current fiction.

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PHYSIOLOGY

Measure Muscle Injury

By using cathode ray tubes and amplifiers, a new technique has been devised which will enable doctors to predict whether muscles will recover from paralysis.

➤ DOCTORS can now predict which muscles affected by polio will return to normal function, the American Congress on Physical Medicine was told in a meeting in Washington.

The new method combines the use of cathode ray tubes in television sets and amplifiers which record the electrical impulses of the muscles. A picture can thus be made of the electric currents in human muscles in the form of ink-drawn lines on a running tape, as visible electrical im-

pulses on a screen, or even as audible sounds over a loud speaker, as the doctor may prefer. This apparatus is known as an electromyograph.

Its first application to clinical work was described by Dr. O. Leonard Huddleston of the University of Southern California School of Medicine; Margaret Clare, research associate, and Dr. Alex Harell, both of Washington University School of Medicine, St. Louis; and Dr. Leonard I. Yamshon of Columbia University.

PUBLIC HEALTH

Famine Danger Foreseen

The rapid growth of world population as a result of scientific advances makes it doubtful that food supplies can keep pace, British are warned.

► WORLD POPULATION will grow at an even greater rate than it has in recent years, bringing danger of famine, the British Association for the Advancement of Science, meeting in Brighton, England, was warned by Sir Henry Tizard in his presidential address. He is chairman of the British Advisory Council on Scientific Policy and Defense Research Policy Committee.

At least 20,000,000 people are added to the population of the world each year and it is conceivable that in another 70 years or even less the world population will have doubled.

Population is increasing where the world already has too many people, Sir Henry said. India's population is gaining 5,000,000 people a year. Egypt's masses, where there are 2,000 people for every square mile of cultivated land, are on the increase because there it pays to have children who work at an early age to the profit of their parents.

In large part the increase in population is due to new methods of preventive medicine. How this operates was shown by an experience reported by Sir Henry. In 1944 a British special mission visited British Guiana, population roughly 400,000, which has remained stationary for the last 20 years. Two-thirds of the population used to live under conditions of severe endemic malaria. Birth rate was low, and infant and adult mortality high.

In 1945, through use of DDT and other methods, the mosquitoes carrying malaria, and also yellow fever and filariasis, were kept under continuous control. The annual cost was less than a dollar per person.

The death rate was reduced, the birth rate doubled and the population is increasing 10% annually. A suburb of the principal city, Georgetown, with a population of about 3,000, had a death rate equal to the birth rate in the years 1933 through 1944. Infant mortality was about 250 per thousand. It rose to 350 in 1944. By the end of 1947, the birth rate doubled and the infant mortality dropped to 67 per thousand.

"In all countries which have a high standard of education," he said, "the rise in population which follows a rapidly decreasing death rate has been kept in check by a voluntary control of births. As a result the average age of the population has considerably increased, and is increasing. This, in itself, does not yet present any serious problem, for, as the proportion of children is much less than it was, the proportion capable of productive work, between the ages of 15 and 65, is actually somewhat

higher. No fundamental difficulty, from this cause, is likely to arise for many years to come.

"But the population of the world as a whole is now increasing by 1% a year, and its distribution is such as to make it extremely doubtful whether the supply of food can keep pace, even with the present low standard of nutrition.

"It is the advance of science that has made this possible. War, pestilence, and famine have kept the population within bounds since the dawn of history. War has ceased to be effective; pestilence is rapidly losing its power; only famine is left as a brake until education takes its place. Is famine inevitable, or will science again come to the rescue, as it has done before?"

Fifty years ago Sir William Crookes, in

a similar address to BAAS, wanted of the danger of famine. He was then alarmed at the prospective shortage of wheat. The chemist by fixation of nitrogen from the air and the plant breeder by improving varieties of crops came to the rescue.

"Now the day has come when we must grapple again with the problem," Sir Henry said. "We must not encourage the easy thought that some entirely new development in science will solve it quickly. There is nothing in sight comparable with the importance of synthetic fertilizers.

"There are certainly some interesting investigations in progress, for instance the production of food yeasts from molasses, and of fats by the action of micro-organisms on carbohydrates. All that can reasonably be said about these new developments at present is that they show the need for fundamental research in an almost untouched field.

"They are very unlikely to lead to a new and substantial source of supply of food within the next 30 years. So far as this country is concerned we must plan our economy on the assumption that food will be both scarce and dear for many years to come."

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50,000,000-VOLT X-RAYS—Heart of a recently completed betatron in the General Electric Research Laboratory, is this glass "doughnut" being examined by Dr. Ernest E. Charlton, head of the X-Ray section. Electrons, emitted from a hot filament inside this vacuum tube, are whirled around thousands of times. As acceleration builds up the magnetic field to its maximum, the orbit of the whirling electrons is shifted and they hit a tungsten target which they missed before. This generates a beam of high-voltage X-rays, and occurs at the rate of 60 times per second.

ASTRONOMY

Meteorites Not So Old

► THE ANCIENT PLANET, from which were broken all meteorites found on the earth today, was born less than 60,000,000 years ago.

This finding, which reduces the relative age of the parent planet from a top limit of some 7,600,000,000 years to a mere 60,000,000 years, is reported by Dr. Carl August Bauer of the University of Michigan in the *PHYSICAL REVIEW* (Aug. 15).

Smaller than the earth, this now-disrupted planet once moved in an orbit between those of Mars and Jupiter. This is where the asteroids or minor planets are found today.

This upper limit on the age of the planet can be established because the uranium and thorium contents of the meteorites he studied are sufficient to produce all of its helium in only 60,000,000 years.

Cosmic radiation thus produces helium in meteorites 70 times faster than he had previously predicted, Dr. Bauer explains. This is true because, to agree with his new findings, cosmic radiation has to produce the helium in 60,000,000 years rather than in 4,000,000,000 years, as previously estimated.

"This high rate of production of helium

in meteorites, as compared to the calculated rate just outside the earth's atmosphere, may arise from the effect of the sun's general magnetic field, as suggested previously, or from secondary helium-producing processes that have not been considered," Dr. Bauer reports.

The new findings overcome two difficulties:

1. Difference in the helium content of different fragments of the same meteorite.
2. Difference from point to point within the same fragment.

Five Bethany meteorites, all located in a limited region of Great Namaqualand, Southwest Africa, upon examination were found to be similar in structure and composition. But one has been assigned to a different meteorite fall because its helium content is so much greater than the others.

This difference can be more satisfactorily accounted for by assuming that the helium was produced by cosmic radiation, Dr. Bauer explains. In this manner the difference in the helium contents of the various fragments would arise from the difference in their location within the original pre-atmospheric mass.

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ever, they are good pollinators and should not be persecuted for any minor damage they may cause.—George E. Bohart, Entomologist, Logan, Utah.

Doesn't Sound Right

If you were comparing a rich man and a poor man, you certainly would not say that the poor man was 400 times less rich than the rich man. In the article "Hundred White Dwarfs" (SNL, Sept. 4), you use such expressions as "400 times less luminous," "35 times smaller," "40,000 times smaller," and "25,000 times too faint." It just does not sound right.—Clarence E. Mange, St. Louis, Mo.

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Letters To The Editor

Got Our Bees Mixed

Your answer to Mrs. Glick's letter (SNL, Aug. 14) erroneously assigns the role of wood borers to leaf-cutting bees (*Megachile*). Certain species do place their leaf nests in wood burrows previously drilled by beetle larvae or other insects. Their activity in removing frass from the holes

may create the impression that they are boring into solid wood.

It is advisable not to attribute unwarranted destructiveness to a group of insects essentially beneficial as pollinators.

Carpenter bees, which are often confused with bumble bees, do drill their nest burrows into wood and may cause structural damage, especially in tropical areas. How-

Question Box

ASTRONOMY

How old was the parent planet of meteorites? p. 180

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GENERAL SCIENCE

Smears Endanger Nation

House Committee on Un-American Activities is called threat to atomic energy research; scientists say national security is jeopardized by irresponsible attacks.

➤ AN IMMINENT THREAT to our national security and our entire governmental atomic energy research program has been called to the attention of President Truman and Governor Thomas E. Dewey by eight distinguished physical scientists, all of whom had participated in the government's atomic energy development.

Tactics of the House Committee on Un-American Activities have made employment on atomic energy research so undesirable that "the combined full-time personnel of highly capable scientists and engineers in the various government laboratories is on the verge of reaching a dangerously low level." Scientists shun government employment because of the possibility of being subjected "to irresponsible smears that may ruin them professionally for life". The hope was expressed that "the situation can be remedied before irreparable harm is done."

Scientists Protest

Signing telegrams to the Democratic and Republican Presidential candidates were: Prof. Harrison Brown of the Institute for Nuclear Studies of the University of Chicago; Dr. Karl T. Compton, President of the Massachusetts Institute of Technology and a member of the President's Loyalty Board; Prof. T. R. Hogness, Director of the Institute of Radiobiology and Biophysics, University of Chicago; Prof. Charles C. Lauritsen of the California Institute of Technology; Prof. Philip M. Morse, until recently Director of the Brookhaven National Laboratories; Dr. George B. Pegram, Dean of the Graduate Faculties of Columbia University; Prof. Harold C. Urey, Institute for Nuclear Studies, University of Chicago; and Dean John C. Warner of the Graduate School, Carnegie Institute of Technology.

All united in appraising "the atmosphere which is being created by actions and smearing methods of the House Committee on Un-American Activities" as creating "a situation within which it is becoming increasingly difficult for scientists and engineers to function."

"The Atomic Energy Commission is in no way to blame for the unfortunate situation that now exists," the scientists said. Since its formation, the Commission has worked vigorously to establish adequate centers for our atomic research. But the Atomic Energy Commission has been needlessly hampered because atomic energy has unfortunately become a 'political football'. As a result the commission has had

to adjust its own workings to the atmosphere created by the Un-American Activities Committee."

It was pointed out that of the 150 senior American scientists mentioned in the famous Smyth Report, an account of the government's wartime atomic energy program, "fewer than 10% are now devoting their full energies to the various government atomic energy programs." It can be expected, the scientists asserted, "that the tactics of the Un-American Activities Committee, if they continue as in the past, will make the situation even more acute."

The messages asserted:

"With the greatest respect to those relatively few excellent men who are now attempting to carry out adequate programs at Brookhaven, Berkeley, Argonne, Los Alamos, Hanford and Oak Ridge, we are forced to the conclusion that the combined full-time personnel of highly capable scientists and engineers in the various laboratories is on the verge of reaching a dangerously low level."

Many former workers on the atomic

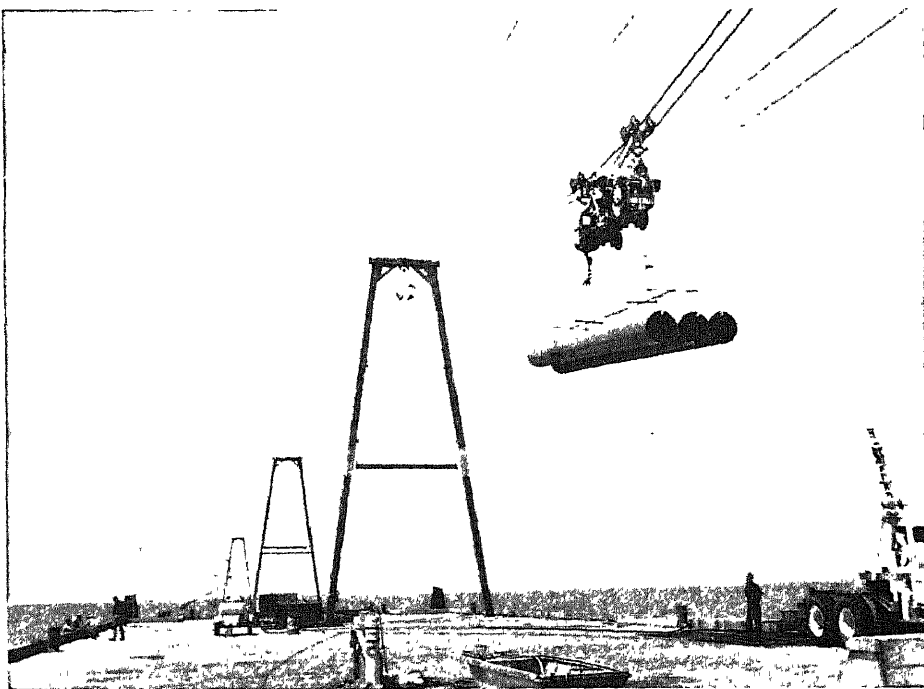
energy project have not remained "because they have found it increasingly difficult to reconcile themselves to government employment on secret projects where they are looked upon by groups such as the Un-American Activities Committee as men not to be trusted, where they must subject themselves to the possibility of irresponsible smears that may ruin them professionally for life. In many cases the men prefer to work elsewhere for considerably lower salaries on research programs completely unconnected with our atomic endeavors."

The climax of the Committee attacks on the scientists was reached this spring, the statement said, when the Committee issued its attack against Dr. Edward U. Condon.

"That attack was so repugnant to scientists that it will be years before the damage can be undone," it was stated. "And in the face of rumors of attacks yet to come, it will become increasingly difficult to retain top scientists in government service."

Conditions for Research

The scientists called upon President Truman and Governor Dewey to consider that "No nation without adequate scientific resources can hope for any degree of security in the event of another war. In the face of this fact, it is important that the leaders of our nation attempt to understand the conditions under which scientific research can be and cannot be done. In particular, if our nation is to have a vigorous government research program, the



TRIP OVER PERSIAN GULF—This skyhook carries tons of steel pipe from vessel to supply base, at Ras el Mishaab, Saudi Arabia. Man-operated, it is equipped with a two-way radio for communication with shore office. The three-mile course along overhead cables is covered in only five minutes.

unhealthy atmosphere that has been created by the Un-American Activities Committee must be removed."

They urged President Truman "to in-

vestigate this situation, and then direct your powers in an attempt to secure a remedy."

Science News Letter, September 18, 1948

GENERAL SCIENCE

"No Brains, No Security"

The following editorial under the title "No Brains, No Security" from the New York Star for Sept. 10 is reprinted by permission:

► THERE is a nice touch of irony in the telegram eight outstanding scientists sent to President Truman and Governor Dewey to protest the smear tactics of the Thomas Committee. The Committee, having decked itself out in the garb of guardian of our national security and political mores, is inclined to answer each protest with the discovery of a new "spy ring." It defends its methods on the grounds that, though occasionally the innocent may suffer, roughshod tactics are necessary to protect the majority. But now in the crucible of the laboratory, where much of our security lies, the Committee has been weighed and found wanting.

The scientists said they had no real objection to a reasonable and competent inquiry for the sake of real security. But—and this was the determined, cold note in their telegrams—the hysterical outbursts of the Committee were causing many able scientists to avoid returning to or going into government service. Within memory of most of us, and presumably of the Thomas Committee, are the magnificent contributions to our atomic energy development by those scientists who, true to their creed of the rule of light and reason, fled the megalomaniacal hysteria of Nazism's late and unlamented leader. What better proof is there that security lies in access to the ablest talent, the brightest minds of our day? And conversely, what greater threat to our security than a group of investigators whose dimwitted tactics keep out of government service some of our finest brains?

Almost as the scientists were protesting, a prize example of what they were driving at came from the Thomas Committee. Even the usually respectful and careful Associated Press fell for the cheap attempt to discredit a solidly scientific project. An AP story on the Committee's hunt for a "third spy ring" led off this way: "The House Committee on Un-American Affairs is tracking down a report that an international group of scientists plans to star gaze from the middle of the Belgian Congo uranium fields." Note how "international group" is tossed in with "star gaze" to suggest something at once sinister and daffy about a project in a land of chattering Geiger counters—and monkeys.

On down in the story one learns on the authority of that eminent Republican

scientist from Pennsylvania—Rep. McDowell—that some \$9,000,000 is to be spent on an astronomical laboratory to be used by French, Dutch and Belgian, but NOT Russian scientists, in the midst of the Congo's most uranium-rich terrain. The Committee, McDowell proclaimed, is going to find out where the money comes from and what the hell is behind the scheme.

Well, we always like to help the Thomas Committee out. On best scientific authority we are able to advise it what the Congo project amounts to.

To show its gratitude for the financial support the Belgian government-in-exile got from the Congo during the war, Belgium decided to establish a laboratory and institute for study of tropical diseases and medicines in the Congo. The project is financed entirely by Belgium, on land under Belgian control, in an area rich in uranium belonging to the Belgians. In short, the project is an all Belgian affair and, like a lot of other things the Thomas Committee pokes its nose into, is none of its damn business.

[Facts about the Belgian Congo project are told in SNL, Sept. 11, p. 167.]

Science News Letter, September 18, 1948

GENERAL SCIENCE

House Committee Is Called "Inhumane"

► DR. LINUS PAULING, President-elect of the American Chemical Society, speaking at the St. Louis meeting, accused the House Un-American Activities Committee of "scorning humane and considerate treatment" in its inquiries.

He said witnesses, especially scientists, are "utterly without protection when the Thomas Committee takes hold." By way of contrast, Dr. Pauling said, the Atomic Energy Commission has handled the security problem "reasonably well."

Dr. Pauling, California Institute of Technology professor, said the commission has handled security cases which warranted dismissal without "unfair publicity" and with a chance for accused persons to defend themselves.

Science News Letter, September 18, 1948

Some natural gases used for fuel and lighting contain 10% or more of non-combustible *nitrogen*; scientists are now trying to find an economical way to take the nitrogen out before the gas is shipped to consumers by pipelines.

PSYCHOLOGY

You Inherit Old Age, Twin Study Reveals

► OLD AGE is inherited.

You can shorten your life by what you do or what happens to you in life, or by failing to take advantage of your constitutional potentialities. But you can't add one year to your limit of vital capacity, Dr. Franz J. Kallman, of the New York State Psychiatric Institute, told the American Psychological Association, meeting in Boston.

This conclusion is based on a study of 2,000 twins over 60 years of age. Not only is long life inherited, but also the ability to stay in good mental and physical health during all the period of senescence.

The likenesses between identical twin children, both in looks and personality, that make it hard for even their own parents to tell them apart, persist through old age, it was observed. They continue even when the twins are separated.

Old people cannot see as well on a dark night as younger men, Dr. James E. Birren, of Baltimore City Hospitals, told the same meeting. Dr. Birren compared 66 men aged 43 to 80, living in the Baltimore Infirmary, with 25 Navy enlisted men aged 18 to 23.

Some of the older men had structural defects which might account for the lack of dark adaptation. But others had no such defects.

Individual differences in the loss of ability to see in the dark are, however, great. The range for the older men is more than twice as great as for the younger men.

Science News Letter, September 18, 1948

PSYCHOLOGY

Faith in Future Runs High in American Youth

► FAITH IN THE FUTURE runs high in American youth of both high and low economic levels, with particular confidence expressed in the opportunities open for young people and success in marriage.

This is disclosed in a study by Dr. H. E. Jones, professor of psychology at the University of California, who tested 659 high school seniors from the same urban school in 1938, 1942 and 1947.

The psychologist asked for comments on 15 items on social and economic conditions and future prospects. There were four possible answers, two giving differing degrees of optimism and two reflecting pessimism.

Paradoxically, the greatest optimism occurred in the spring of 1942, when the subjects were facing the draft and when American military fortunes were at their lowest ebb in World War II. Optimism is still high, though not so high, generally, as in 1942.

On the statement, "There are actually a great many more opportunities today than ever before," 1 in 5 were in agreement in

1938, 9 out of 10 in 1942, and 1 in 2 in 1947.

On the subject of marriage, the youths were as optimistic in 1947 as in 1942. The conviction that "If people really want to, they can always establish a home and family without any great sacrifice, even in bad times" increased from 1938 to 1942 and remained strong in 1947.

Science News Letter, September 18, 1948

PSYCHOLOGY

Home Babies Are Brighter Than Ones in Institution

➤ **EVEN** young babies in a good institution do not score as bright on mental tests as do babies in a private home.

Two hundred infants from six weeks to 12 weeks old were given infant intelligence tests in a study reported to the American Psychological Association in Boston by Dr. A. R. Gilliland of Northwestern University. Half the babies lived in a good institution. Half are in private homes.

The average IQ of the institution babies was 97.5, that for those in private homes 109.5.

Apparently whether the parents are rich or poor does not have any effect on the mental development of such young babies. Those in the finest homes did not score higher than those in the poorest families.

The oldest child in a family tends to think differently from his younger sisters and brothers, the same meeting learned from Dr. Joan Kalthorn, of Fels Research Institute, Antioch College.

The first child in the family is likely to excel on abstract thinking. The younger child is superior on more realistic tasks. The younger child also tends to have a higher total intelligence score than his older brother or sister.

A possible explanation offered by Dr. Kalthorn is that the older child received more intellectual stimulation and companionship from adults. The younger child is less protected and has more freedom to explore and develop his own capacities.

Dr. Kalthorn studied 39 pairs of first and second children. They ranged in age from 30 months to 12 years.

Science News Letter, September 18, 1948

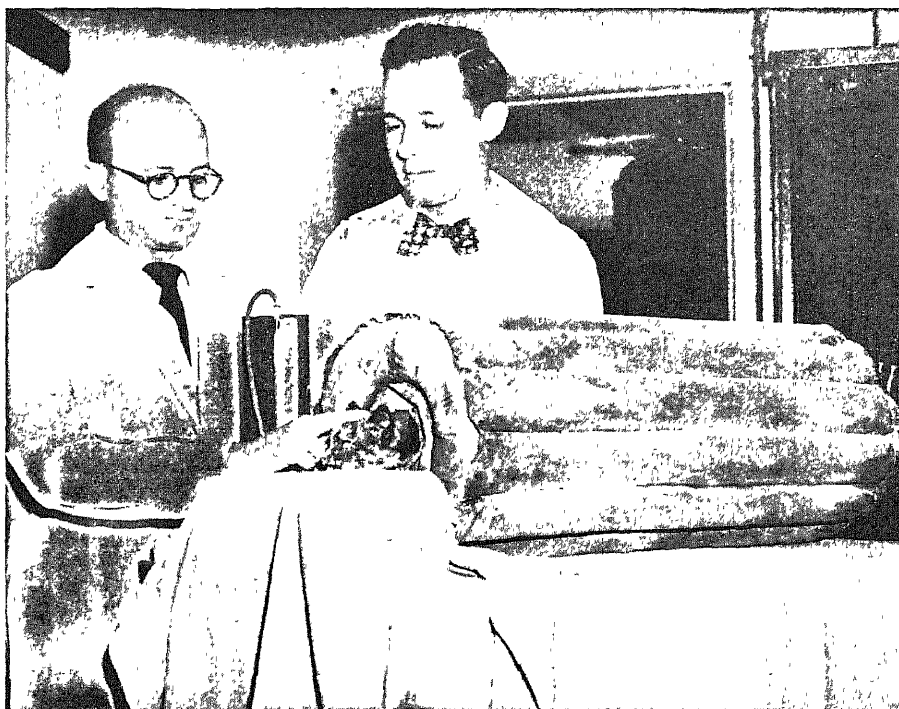
MEDICINE

Refuge from Hay Fever Possible in Park Areas

➤ **IF YOU ARE** seeking a refuge from your sniffles and sneezes during the hay fever season, go to the national parks of the Rocky Mountain, Cascade, Olympic, and Sierra regions.

Thirteen years of pollen testing have shown that these regions are excellent ragweed refuges, Dr. O. C. Durham of the Abbott Laboratories said in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 11).

Science News Letter, September 18, 1948



NEW LIGHT-WEIGHT "IRON LUNG"—This cat is breathing artificially in the new Yale cloth respirator. It was developed by Dr. Harold Lamport, left, and Dr. Ralph D. Eichhorn, right.

MEDICINE

Collapsible Cloth "Lung"

Polio patients would benefit from this inexpensive, light-weight respirator, if it can be produced commercially. Successful tests were made with a cat.

➤ **PARALYZED** polio victims may soon have available a cloth type of "iron lung" that is inexpensive and can be folded to fit into a suitcase.

This rubberized cloth respirator was tested successfully at Yale University on an experimental animal, its designers, Drs. Harold Lamport and Ralph D. Eichhorn, reported in the journal, SCIENCE (Sept. 10).

An experimental man-size model has been made for commercial use but several technical problems exist which the manufacturer must still solve. These are: how to provide proper portholes for patient care; how best to get a person in and out of the respirator; and whether to use it with a standard hospital bed or as a self-contained unit.

This new model uses the same principle as the "iron lung." It subjects the paralyzed patient to rhythmic negative pressure to help him breathe. It is cylindrical in shape and weighs less than two pounds when fully inflated.

Comparing its structure to a thermos flask, the doctor said it has air-tight inner

and outer walls with sustained air pressure between. Partitions extend the length of the cylinder but are not attached at the ends so that air under pressure can be introduced from a single inlet.

The end where the head protrudes is sealed off by a plywood disk with a sponge-rubber neck piece. This contains tubes to measure the pressure and to permit evacuating the chamber. To induce the rhythmic respiration, standard methods such as bellows, diaphragm, or vacuum pump with a flexible hose, can be used.

They also designed another model made of plastic sheeting which has so far proved unsatisfactory. However, they feel that this one has considerable promise because of the possibility it offers of having a completely transparent respirator which would aid in nursing and medical care.

The idea for the respirator was conceived by Dr. Lamport when he was working at Yale during World War II on the pneumatic lever suit which prevents blackout of pilots maneuvering at high speeds.

Science News Letter, September 18, 1948

PHYSICAL MEDICINE

Civilian Amputees Lack Attention Given GI Cases

► THE FOUR war years produced 120,000 civilian amputees and 18,000 military amputees. Yet for this larger group of civilians there exists no such coordinated rehabilitation program as for the GIs, the American Congress of Physical Medicine was told at a meeting in Washington.

Inadequacy in preparing the civilian amputee for the life he must face when he leaves the hospital was described by Dr. Henry K. Kessler, director of the Hasbrouck Heights' Amputee Clinic at Newark, N. J.

These civilians must be provided proper facilities if they are to be absorbed into the national life, Dr. Kessler pointed out.

He suggested that an effective program of rehabilitation should embrace five phases. Psychologically, the amputee needs reassurance and preparation during convalescence for the period when he can use the artificial limb. Surgically, the 30 or 40 sites of amputation can now be reduced to four basic ones, permitting a better fitting of artificial limbs. After care of the stump should be aimed at preventing its becoming contracted, weak, or improperly shrunk. In the fitting of artificial arms or legs, the emphasis should be on comfort, correct length, correct alignment and durability. And lastly, the amputee must be taught to develop skill in using his artificial arm or leg.

Science News Letter, September 18, 1948

POPULATION

Heart Victim Not Harmed By Temperature Changes

► IF YOU HAVE heart trouble, stop worrying about going shopping or to a movie on a hot day because of the extreme change of temperature in air-conditioned places. This advice was given in a report to the American Congress of Physical Medicine in Washington.

Tests were made with ten healthy adult males and 21 men with heart trouble. There was no difference in their adjustment to a sudden change in temperature, Dr. Nathaniel Glickman, of the University of Illinois College of Medicine in Chicago, told the Congress.

Science News Letter, September 18, 1948

ELECTRONICS

Hearing Aids To Have Longer-Lasting Battery

► A NEW KIND of dry battery that is lighter and longer-lasting because it uses oxygen from the air, instead of from chemicals within it, was announced by Dr. Lauchlin M. Currie, research vice-president of National Carbon Company.

People who wear electronic hearing aids will be the first to benefit from this development. The new A battery weighs about an ounce and lasts 80 hours, three times as long as a slightly heavier cell it replaces.

"The new outfit offers the largest output of electrical energy in the lowest weight and volume ever delivered in a commercial battery," Dr. Currie explained.

No metal oxides are used as the depolarizing agent that keeps the battery from stalling. This effect is secured by using a highly-active carbon electrode that takes up oxygen from the air when the battery is unsealed for use. A paste around the electrode holds the necessary electrolyte which, in effect, is regenerated. The battery continues to operate until the pure zinc anode is used up in the chemical action that produces the electricity.

Use of the new type battery in larger installations, some of military importance, was predicted by Dr. Currie.

Science News Letter, September 18, 1948

GENERAL SCIENCE

Science Writing Award Winners Are Announced

► A MAGAZINE ARTICLE on old age and newspaper stories on a new antibiotic have won \$1,000 George Westinghouse Science Writing Awards.

Florence Moog, of Washington University, received the magazine award for an article, "The Biology of Old Age," while the newspaper award was made to Frank Carey of the Associated Press, in Washington, for his stories on chloromycetin. Honorable mention in the magazine division went to a free-lance writer, Herbert Yahraes.

The awards were made during the centennial meeting in Washington of the American Association for the Advancement of Science.

Science News Letter, September 18, 1948

ASTRONOMY

New Comet Found In Southern Skies

► ANOTHER FAINT new comet has been discovered. In the far southern constellation of Sculptor, it is moving southwest.

This is the tenth comet spotted so far this year. Surprisingly, eight of the comets have been new objects and only two periodic comets whose return was expected.

Comet Johnson, of the thirteenth magnitude, was found on Sept. 1 by E. L. Johnson of the Union Observatory at Johannesburg, South Africa. News of this discovery was cabled by Dr. W. S. Finsen of the observatory to Mlle. J. M. Vinter-Hansen, well-known astronomer at Copenhagen. She forwarded the report to Harvard Observatory, American clearing center for astronomical discoveries.

Science News Letter, September 18, 1948



PSYCHOLOGY

Cocktail Makes Cringing Dog Stand Up for Himself

► A COCKTAIL will make even a cringing dog assert himself, Dr. W. T. James, of the University of Georgia, told the meeting of the American Psychological Association in Boston.

A litter of four Dalmatian-setter hybrids were studied by Dr. James. The one female was the boss of the family and was also the largest.

One little male pup, smallest of the litter, was the most submissive. He never got enough to eat unless he was fed by himself.

But a dose of .55 cubic centimeters of alcohol per kilo of body weight, if given to him eight or ten minutes before the dogs were fed, gave him the temporary courage to stand up for himself. This dose is comparable to a single "shot" of whisky for a 150-pound man.

Separate feeding soon brought the little dog up in weight until he equalled his two more dominant brothers. But his nature was still submissive. He still failed to get enough to eat if he had to compete with the others to get it.

Science News Letter, September 18, 1948

ENGINEERING

New Injection for Gas Boosts Auto's Power

► AN ALCOHOL-WATER injection for the gasoline in a car's engine, adapted from the wartime anti-detonant injection used in American warplanes, may give motorists more power and less "knock" on hills.

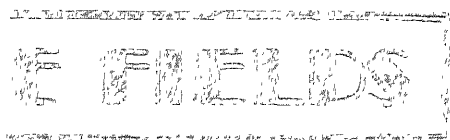
The injection fluid, called Vitol, and an auxiliary carburetor, the Vitameter, were demonstrated by the Thompson-Toledo Vitameter Corporation in Cleveland. In addition to improved car performance, the injections may mean a saving in fuel supplies, company officials pointed out.

Using the booster fluid has the effect of raising the gasoline's octane rating by 10 to 20 numbers, it was explained.

Vitol consists of 85% alcohol and 15% water, with tetraethyl lead and soluble oil. In wartime planes, 50-50 alcohol and water solution was used.

The Vitameter developed to give the booster "shot" operates only when the engine needs extra power, as in starting suddenly or in climbing hills. It can be installed in a car in less than an hour and will retail for approximately \$30. Vitol, the injection fluid, is comparable in cost to motor oil, it was reported.

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GENETICS

20,000 to 42,000 Genes Found in Each Body Cell

➤ YOU HAVE somewhere between 20,000 and 42,000 of the heredity-determining units, called genes, in each of the tiny cells which form your body.

This new estimate is made by Dr. J. N. Spuhler of Ohio State University.

Genes are invisible but important chemical groups. They determine such characteristics as your height and body type, the color of your hair and your eyes and the presence or absence of such inherited defects as bleeding and colorblindness. They may perhaps also determine such traits as literary genius or musical talent. Some of these traits are determined by a single gene. Others involve a number of genes acting together.

Dr. Spuhler reports his findings in the journal, *SCIENCE* (Sept. 10). He based his calculations on the known number and size of the chromosomes which carry the genes and studies of the genes of other organisms whose hereditary makeup is better understood than man's.

Science News Letter, September 18, 1948

METEOROLOGY

Different Species of Snow Produced in Laboratory

➤ VAPORS can be used to produce different types of snow in the laboratory.

Use of vapors to change snow from one type to another was disclosed by two General Electric scientists, Dr. Vincent J. Schaefer, who produced the first man-made laboratory snowstorm, and Dr. Bernard J. Vonnegut.

They used 30 different vapors in experiments with transforming snow into different shapes. Cold-chamber snow in the laboratory is usually in the form of hexagonal plates. The vapors changed the snow into four different, recognizable shapes, and other freak shapes which may be transitional stages between the other forms.

Science News Letter, September 18, 1948

GENERAL SCIENCE

Creativeness Endangered, Chemists' President Says

➤ ORIGINALITY and creativeness in American research is being endangered by transferring to scientific investigation the techniques employed in the mass production of goods, Dr. Charles Allen Thomas, executive vice-president of the Monsanto Chemical Co., St. Louis, charged in his

presidential address to the American Chemical Society meeting.

"Are we becoming nut-tighteners and wrench welders on an assembly line of industrial and university Research?" Dr. Thomas asked. "Perhaps we have straight-jacketed our imaginations within the confines of narrow disciplines and lost sight of the end products. We have failed to see the great difference between physical and intellectual production."

Dr. Thomas admitted that some specialization is necessary so that inquiry is not diffused over such a large field as to lose its effectiveness. He recalled that the Jack-of-all-trades is seldom master of any. Creative specialization must, he said, escape being as esoteric and fruitless as the ancient question of the number of angels on the head of a pin.

Science News Letter, September 18, 1948

PALEONTOLOGY

Discover Ape Bones Which Are Very Close to Human

➤ BONES of ancient African apes that seem to be closer to the human line of descent than any hitherto discovered were described before the meeting in Brighton, England, of the British Association for the Advancement of Science by Prof. W. E. Le Gros Clark. They indicate that the animals got about by walking and running, instead of swinging from branch to branch on overdeveloped arms with hook-like hands, after the quite un-human manner of the modern great apes.

Among the large and varied ape fauna of East Africa described by the speaker were some animals the size of modern chimpanzees, and others as big as present-day gorillas. Some of the fossils indicate a former land connection with Asia.

Science News Letter, September 18, 1948

AERONAUTICS

Largest Non-Rigid Airship Planned for Navy Patrols

➤ THE LARGEST, non-rigid blimp in the world will be built for the U. S. Navy by the Goodyear Aircraft Corporation.

The Department of the Navy revealed that a contract has been let for the "N" blimp. It will be nearly twice as large as the blimps used in World War II anti-submarine patrols and will be able to operate on long-range patrols.

Envelope of the new lighter-than-air craft will be 324 feet long, 71 feet wide and 92 feet high at its tallest point. A crew of 14 officers and men and two 800-horsepower Wright Cyclone aircooled engines will be housed in an 87-foot car under the envelope.

Rayon fabric coated with neoprene synthetic rubber will be used in the construction of the envelope which will have a capacity of 825,000 cubic feet of helium gas.

Science News Letter, September 18, 1948

GEOLOGY

Present U.S. Coast Was Once a Chain of Islands

➤ CHAINS OF ISLANDS were strung out along the present coasts of the United States, while the continent was about half the size it is now.

This is how America looked half a billion years ago, in the new theory proposed by a Columbia University professor.

Shallow seas and deep troughs bordered a central lowland. The volcanic island chains followed roughly the present borders of the continent. This picture of early Paleozoic North America was presented to the International Geological Congress in London by Prof. Marshall Kay, Columbia geologist.

Sometime during the Paleozoic era, Prof. Kay believes, the present limits of the continent were formed.

Study of rocks from the Atlantic and Pacific coasts have revealed fossils from that era. But the rocks have undergone great changes due to mountain-making movements during the Paleozoic.

Along the Atlantic coast, the early island chain stretched from Newfoundland to Georgia. It then curved westward along the northern edge of the Gulf of Mexico, into today's northern Mexico and back out to the modern Antilles. It finally reached into what is now northern South America. The Pacific chain extended from the Aleutians down through the coastal provinces and states, perhaps as far as the western Andes of modern times.

Science News Letter, September 18, 1948

NUCLEAR PHYSICS

U.S. Radio-Isotopes in Use In 21 Foreign Nations

➤ TWENTY-ONE foreign nations are now benefiting from the by-products of U. S. atomic energy in the form of radioactive isotopes. Their use ranges from tracing life processes to treating fatal diseases.

Already 216 isotope shipments have been made overseas since their export was authorized from the Oak Ridge National Laboratory last September.

Australia received the first consignment. It consisted of a small amount of radioactive phosphorus for use in treating polycythemia vera and leukemia. The first disease is marked by an excessive production of red blood cells and leukemia has been called "cancer of the blood." The Australians reported "good" results.

The 21 nations which have made formal arrangements to receive radio-isotopes are: Argentina, Australia, Belgium, Canada, Cuba, Denmark, France, Iceland, India, Ireland, Italy, The Netherlands, New Zealand, Norway, Peru, Spain, Sweden, Switzerland, Turkey, Union of South Africa and the United Kingdom.

Science News Letter, September 18, 1948

MINERALOGY

Air Makes Concrete Lighter

Taller and less expensive buildings are now possible with this new lightweight material, since it will eliminate much dead weight.

By MARTHA G. MORROW

See Front Cover

► CONCRETE is being made lighter these days simply by getting more air into it. Some is so light it floats on water.

Lightweight concrete makes possible taller and less costly buildings.

Designed to eliminate much of the dead weight in buildings, concrete made with such air-filled aggregate as expanded perlite and pumice weighs only a fraction as much as that employing the traditional sand, gravel and crushed stone.

Air also is whipped into the mortar. This is done by using air-entraining agents such as tallow and resin. Concrete made in this way is less affected by freezing and thawing.

Some air is normally trapped in concrete, ordinarily about one percent. That incorporating from four to six percent of air can more effectively resist disintegration caused by repeated freezing and thawing, studies at the National Bureau of Standards indicate.

Easily Molded

When air-entraining agents are used, the concrete can be molded much more easily and less water is needed in the mixture. Themselves water-repellent, they tend to make the particles in the concrete mix more uniformly. Such concrete, however, does not adhere to steel reinforcement quite as well as regular concrete.

The foaming agent can either be ground into the cement at the mill or be added at the time of mixing. Such materials as tallow, certain types of resins, lime stearate and waste liquor from sulfite paper mills have been used successfully.

Lightweight aggregate concrete also can be made more workable and more resistant to freezing and thawing by entrapping air. As much as 15 or 20% of air is incorporated.

The need for lightweight building materials was emphasized toward the end of the last century when building design changed from thick, heavy, load-bearing walls such as brick or stone to a framework of structural steel beams and columns with thin walls, and then to reinforced concrete.

Ordinary concrete such as you find in sidewalks and highways is heavy. Using sand and gravel as the aggregate, it weighs about 150 pounds per cubic foot. It can be made strong and durable, but there are many instances where such a heavy con-

crete is disadvantageous.

Concrete using a lightweight aggregate makes it possible without additional weight to construct higher buildings, or to add several stories to buildings already existing that could not safely support a greater weight. Also less structural steel is needed, so the total expense of the building can be cut enormously.

The term "lightweight" was first applied to concretes using expanded clay or shale as an aggregate. Such concrete weighed about 100 pounds per cubic foot. In recent years, however, a satisfactory concrete weighing as little as 25 to 50 pounds per cubic foot has been produced by using such mineral aggregates as expanded perlite and expanded vermiculite.

Concrete blocks using lightweight aggregates have many of the same characteristics, but in varying degrees. Most of them can be sawed and nailed like wood, and give good insulation against heat and sound.

Expanded vermiculite produces an excellent concrete for roofing or insulation, but possesses little structural strength. The mineral itself is a special type of mica that expands when heated. It has about a million extremely thin layers to an inch. Be-

tween each layer is a tiny amount of water. When flakes of the mineral are heated, the minute layers open out to about 15 times their original size.

To produce the golden bits of expanded vermiculite, the mineral is dried, ground and heated to about 1,800 degrees Fahrenheit for only four to eight seconds. Only recently has expanded vermiculite been used in lightweight concrete weighing one-third to one-sixth as much as regular concrete.

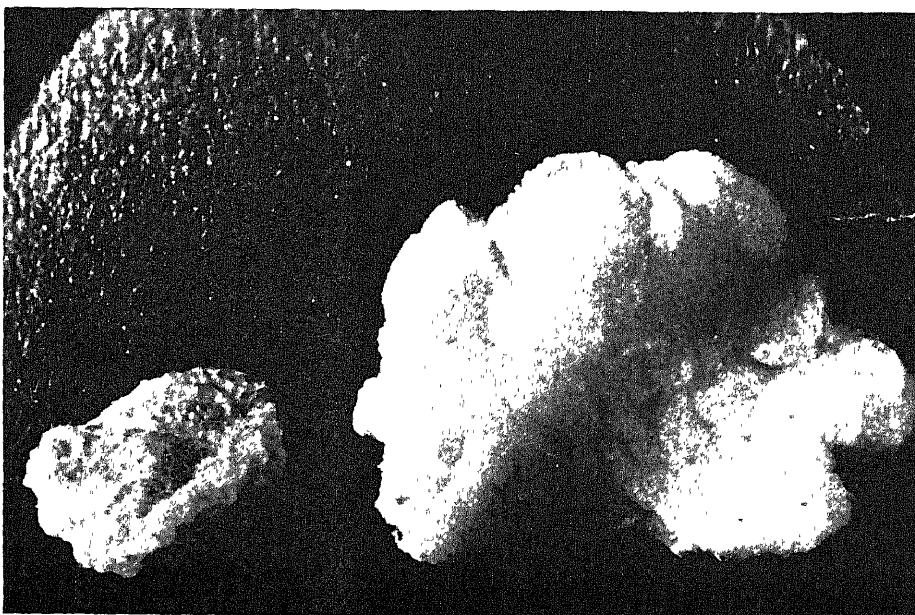
Vermiculite concrete is so light it floats on water, while concrete made with the traditional sand and gravel aggregate sinks as shown on the cover of this week's SCIENCE NEWS LETTER.

Volcanic Glass

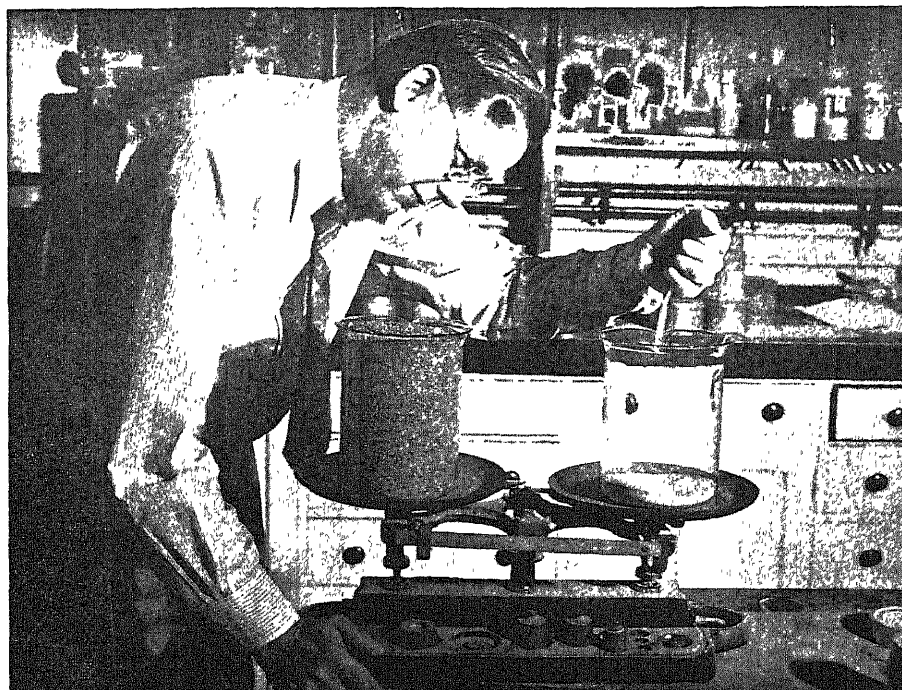
Expanded perlite, a natural volcanic glass, is used for a concrete with excellent insulating qualities. It is not considered well adapted, however, to construction where high strength is required. Concrete made from it weighs as little as 40 to 65 pounds per cubic foot.

Perlite usually is a soft pearl-gray in color. Although known for many years, its commercial production as a lightweight aggregate for plaster and concrete is relatively new.

Perlite is three-fourths silica, the principal constituent of sand. It is permeated with tiny pockets of entrapped water. When the mineral is crushed and heated



PUFFED MINERAL AIDS BUILDING—Perlite is mined as a compact mineral, as shown at left, but when it is ground and heated, water inside the rock forms steam which puffs it out (right).



EXPANDED MINERAL—Featherweight vermiculite, excellent for roofing or insulation, weighs only about a tenth as much as sand, being measured at right.

red-hot, the water turns to steam and puffs up the material so it contains minute air cells.

Nature put the air cells in pumice. Related to perlite in origin, this solidified froth was formed a little farther out from the volcanic core. Pumice is used to make a strong concrete weighing 60 to 90 pounds.

Pumice is the result of violent eruptions. The material from which it was created was almost completely liquid when forced out of the volcano. It cooled so fast that there was no time for the melted rock to crystallize. The vapors dissolved in it were suddenly released and the whole mass swelled up into a frothy mineral which hardened.

The use of pumice in building goes back to the days of the Romans. Fragments of pumice were employed as aggregate to reduce dead weight in many of the great domes such as the Pantheon and of the immense vaults of the public baths in Rome.

Slag, produced in the manufacture of pig iron, is cooled from the molten state with water to produce a sturdy, cellular material. The heat of the slag instantly turns the water into steam which, expanding enormously, puffs or "foams" the slag. Practically all of the water evaporates and the expanded slag incorporates only a small amount of moisture.

Foamed slag weighs only about half as much as does air-cooled blast-furnace slag. The concrete using it as an aggregate weighs approximately 80 to 100 pounds per cubic foot. In 1947 a million and a quarter tons of foamed slag were used for concrete.

Some types of clay, shale and slate are heat-treated to form a lightweight product. After being taken from the bank or quarry, the material is reduced to a proper fineness, then dumped into a rotary kiln. Here it softens to the consistency of chewing gum. As it is heated at a temperature greater than 2,000 degrees Fahrenheit, the material expands greatly.

This expanded material is one of the most widely-used lightweight aggregates. Created under intense heat, it is particularly good for use in concrete that may be subjected to extremely high temperatures.

Cinders, left from coal or coke that has

A noted physicist
explains the principles
behind
the atomic bomb

ATOMIC ENERGY

By KARL K. DARROW,
Physicist, Bell Telephone
Laboratories, and Secretary
of the American Physical
Society

Here, in book form, are the four Norman Wait Harris Lectures that Karl K. Darrow delivered at Northwestern University. His clear, conversational style makes the material interesting, readable, and easy to understand.

An Exciting Story

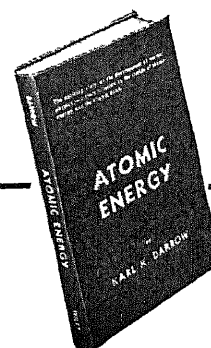
Dr. Darrow gives you the essentials of this exciting story of nuclear theory. He describes the scientific background of atomic energy, its development and its potentialities. Beginning with the atom, he explains its structure, concentrating on the important role of the nucleus. He leads the reader through a discussion of isotopes, the transmutation process, radioactivity, and finally, the man-made chain reaction.

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Tetanus, or lockjaw, is not caused by a rusty nail as many believe but by a germ that is often present in soils contaminated by the body wastes of cattle, horses and other animals.

The service life of fence posts of common non-durable woods can be doubled if they are treated before set in the soil with such preservatives as copper naphthenate, creosote, zinc chloride or pentachlorophenol.

The *highland flower mouse* is a rat-like rodent of Nepal, the Himalaya nation north of India; it lives in grass nests in hollows in decayed trees.

To the Person who is

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been burned, are mixed with sand to form a concrete that weighs 35 to 40 pounds less per cubic foot than regular concrete.

Each lightweight aggregate has certain distinct characteristics. If insulation is the primary consideration, then expanded vermiculite is the choice. If insulation is important and some structural strength is required, then perlite is often preferred.

When great strength is essential as well as light weight, pumice, foamed slag, expanded clay and shale, or one of the other strong but air-filled aggregates will be called into service. Here the availability of the material may be the determining factor. Pumice, for instance, is widely used on the Pacific Coast, where it is found in certain volcanic regions. Foamed slag is popular in the East and Middle West, where large numbers of blast furnaces are located.

ASTRONOMY

Comet Ashbrook Brighter

➤ COMET ASHBROOK, spotted a few weeks ago in the constellation of Aquarius, the water carrier, is increasing in brightness. But it will probably never become bright enough for you to see without the aid of at least a small telescope.

The comet will make its closest approach to the sun next April 25, and will be nearest the earth the end of this month, calculates Dr. Allan D. Maxwell of Howard University, Washington. On Sept. 30 the head of the comet will come within 218,000,000 miles of the earth, he estimates; this is also the distance it will be from the sun on its nearest approach.

Now visible in the southeast, the comet was spotted on Aug. 26 by Dr. Joseph Ashbrook of Yale University Observatory while at the Lowell Observatory, Flagstaff, Ariz. It was of the 12th magnitude when found.

The comet will probably never become brighter than 10th or 11th magnitude, Dr. Maxwell says. It will reach its maximum brightness in March and April of next year, but at that time the sun will interfere with our seeing it.

Now 10 to 12 degrees north of the bright star Fomalhaut, the comet is moving so slowly that it will not leave the constellation of Aquarius until early next year. Just missing the constellation of Pegasus, the winged horse, it will swing into the constellation of Pisces the fishes, and on into Aries, the ram.

By the end of June it will be in the vicinity of the star Capella, of 0.2 magnitude and hence one of the brightest in the sky. During September of next year it will be in the constellation of Gemini, the twins. This is about as far north as it will get.

The best time to look for the comet is in the early morning hours, about one or two o'clock. On Wednesday, Sept. 22, it

These and many other promising lightweight aggregates are being thoroughly tested as to insulation against heat and sound, strength, ability to withstand repeated freezing and thawing, and other important qualities. This is done by the National Bureau of Standards and the Bureau of Reclamation under the sponsorship of the Housing and Home Finance Agency. From such studies will result better office buildings, apartment houses and homes in the future.

A number of these lightweight extenders have been collected for you by Science Service. For the nominal fee of 50 cents you can receive specimens of expanded shale or clay, pumice, perlite ore and expanded perlite, vermiculite ore and expanded vermiculite. These are accompanied by a number of interesting experiments you can perform with the aggregates. Write Science Service, 1719 N St., N. W., Washington 6, D. C., and ask for the kit of lightweight aggregates.

Science News Letter, September 18, 1948

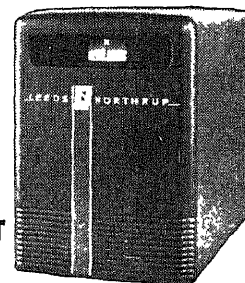
will be found at right ascension 22 hours, 48.8 minutes; declination negative 13 degrees, 39 minutes, Dr. Maxwell reports. On Thursday, Sept. 30, look for it at right ascension 22 hours, 42.2 minutes; declination minus 13 degrees, four minutes.

Science News Letter, September 18, 1948

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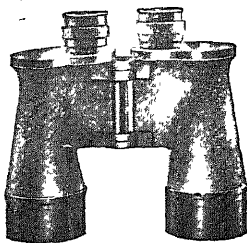
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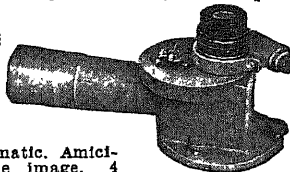
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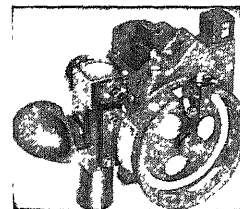
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PHYSIOLOGY

Save Muscles in Polio

➤ LOSS OF MUSCLE STRENGTH in victims of polio can be prevented by stimulating them with electrical current, the American Congress of Physical Medicine was told in Washington.

Good results with electrical stimulation treatment were reported by Dr. Stafford Osborne and Dr. A. J. Kozman, of Northwestern University Medical School, Chicago; Dr. Harry D. Bouman of the University of Wisconsin School of Medicine; and Dr. Andrew C. Ivy of the University of Illinois College of Medicine.

One group of patients treated had had polio ranging from six months to six years, while in the other group the electrical stimulation technique was begun im-

mediately after diagnosis of the disease. Treatment was given daily for six days a week for an average period of nine months.

In both groups the doctors reported favorable results. In the patients who had polio the longest, the size of the treated muscles increased. In the new group of polio patients, muscle stimulation prevented their wasting away.

A "remarkable psychological effect" also resulted. Polio patients were encouraged to see and feel motion in muscles that they could not previously move. This aided their re-educational process.

The physicians recommend that the treatment should be started immediately after diagnosis of polio has been made.

Science News Letter, September 18, 1948

PSYCHOLOGY

Sex Criminals Prejudiced

➤ SEX CRIMINALS are more deeply prejudiced than are other prisoners against other races, religious groups, foreigners or other minority groups, Dr. William R. Morrow, of the Menninger Foundation, Topeka, Kans., found in a study of the hostilities of inmates of a state prison. Dr. Morrow reported his study to the American Psychological Association meeting in Boston.

At first, his study seemed to show no difference between other types of offenders in the extent of their intolerance toward minorities. More intensive study of 14 inmates, however, showed important differences in their motivation.

The crimes of the highly prejudiced prisoners were, without exception, desperate attempts to prove that they were "tough" and "he-men." They were attempts to act the badman by grabbing power, or were sex crimes against women which showed a hostile, exploitive character.

The crimes of those who have little prejudice against other races or religious groups are of a completely different sort. These men, with only one possible exception, seemed to be trying to find mothering or love. They were driven to their crimes by their failure to find the mother-like affection that they craved.

Science News Letter, September 18, 1948

Baby Mental Tests

➤ BABIES under six months old can be given baby mental tests to predict whether they will be bright when they grow older.

Later tests show that these predictions are actually better than was expected, Dr. Sibylle Escalona, of the Menninger Clinic, told the meeting.

The predictions were made to aid in the placing of babies for adoption and were based on 113 tests given to 51 babies.

Science News Letter, September 18, 1948

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CHINESE IDEAS IN THE WEST—Derk Bodde—*American Council on Education*, 42 p., illus., paper, 50 cents. An interesting introduction to the culture of a distant land. Many of our ideas were known very early in China; Cinderella (Sheh Hsien) lived there, complete with cruel stepmother, lost slipper and all.

GENERAL CYTOLOGY—E. D. P. De Robertis, W. W. Nowinski and Francisco A. Saez—*Saunders*, 345 p., illus., \$5.50. A revision of a work originally published in Argentina in 1946, translated by Warren Andrew. Brings together the most important aspects of modern cytology.

HIGHWAY RESEARCH BOARD—PROCEEDINGS OF THE TWENTY-SEVENTH ANNUAL MEETING: Washington, D. C., December 2-5, 1947—Roy W. Crum, Fred Burggraf and W. N. Carey, Jr., Eds.—*Highway Research Board*, 523 p., illus., \$7.50. Of interest to engineers, especially those concerned with road construction and maintenance and with soil mechanics.

THE LAND AND FRESH-WATER MOLLUSKS OF PUERTO RICO—Henry Van Der Schalie—*University of Michigan Press*, 134 p., illus., paper, \$2.50. There are about 114 species of inland molluscan fauna, but only about a dozen are fresh-water forms. Some are disappearing with the changes made by man.

MINERALOGICAL AND STRUCTURAL EVOLUTION OF THE METAMORPHIC ROCKS—Francis J. Turner—*Geological Society of America*, 342 p., \$3.00. Emphasizing the importance of regarding metamorphic, like igneous, rocks as products of chemical and physical evolution.

NEW TECHNIQUES OF HAPPINESS—Albert Edward Wiggam—*Wilfred Funk*, 352 p., \$3.75. An inspirational type of book by a popular author.

OCEANOGRAPHIC OBSERVATIONS ON THE "E. W. SCRIPPS" CRUISES OF 1941—H. U. Sverdrup—*University of California Press*, 407 p., paper, \$2.00. Data gathered on cruises undertaken to study hydrographic conditions and the distribution of sardine eggs and larvae off southern California.

PUBLIC ADMINISTRATION ORGANIZATIONS: A Directory of Unofficial Organizations in the Field of Public Administration in the United States and Canada, 1948—*Public Administration Clearing House*, 216 p., \$3.50. Lists nearly 2,400 organizations with addresses and other data.

RAINFALL AND RUNOFF—Edgar E. Foster—*Macmillan*, 487 p., illus., \$9.00. A comprehensive book for engineers and students of hydrology.

REPORT ON THE GREEKS: Findings of a Twentieth Century Fund Team Which Surveyed Conditions in Greece in 1947—Frank Smothers, William Hardy McNeill and Elizabeth Darbishire McNeill—*Twentieth Century Fund*, 226 p., illus., \$2.50. A first-hand account of what is happening in a land troubled by anxiety and poverty.

SELF-ANALYSIS QUIZ FOR SUPERVISORS AND EXECUTIVES—Rexford Hersey—*American Management Association*, 24 p., paper, 25 cents. Would you make a good boss? This test is

compiled by a member of the faculty of the University of Pennsylvania. Yes, answers are in the back of the book.

STUDENT'S HANDBOOK OF SCIENCE—Bernard Udane and Herman W. Gillary—*Ungar*, 208 p., illus., paper, 75 cents (60 cents each for ten or more). A book of useful information for high school students of science, especially members of science clubs.

VIKING FUND'S ACTIVITIES FOR THE YEAR ENDED JANUARY 31, 1948—*Viking Fund*, 66 p., illus., paper, free upon request to publisher. Reporting on the year's activities in promotion of research in anthropology.

WHAT'S YOUR MANAGEMENT I.Q.?—Ellis H. Woolley—*American Management Association*, 12 p., paper, 20 cents. Intended to show the administrator or supervisor where he needs to strengthen his own knowledge.

Science News Letter, September 18, 1948

RADIO

Railway Coach Made into Mobile Ionospheric Lab

➤ A CONVERTED railway coach houses Canada's first mobile ionospheric observatory. It has just been put into operation by the Defense Research Board on the

railroad to Fort Churchill.

Future broadcasts will probably reach you more clearly because of observations made with this traveling laboratory. Studies made in Manitoba, coordinated with those obtained by 63 other stations throughout the world, will help radio broadcasters select the best frequencies to use. They will also aid in making ionospheric storm warnings.

Canada is already operating a number of ionospheric stations in the north country, but this is the first fully mobile one. The lab will operate over the Hudson's Bay Railroad between Portage La Prairie and Churchill. One round-trip will be made every three months, with week-long stops at chosen locations on the rail line.

The zone of northern lights, which covers all of northern Canada, is highly suitable for such study of ionospheric conditions. Charged particles, emanating from spots on the sun, are deflected closer to earth by the earth's magnetic field in this region.

The new mobile ionospheric station will send radio beams as high as 200 miles above the earth. These are reflected back by the ionosphere. Based on information thus obtained about conditions in the upper air, future radio transmission conditions can be predicted and suitable frequencies for long distance radio communication selected.

Science News Letter, September 18, 1948

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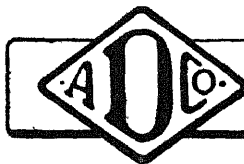
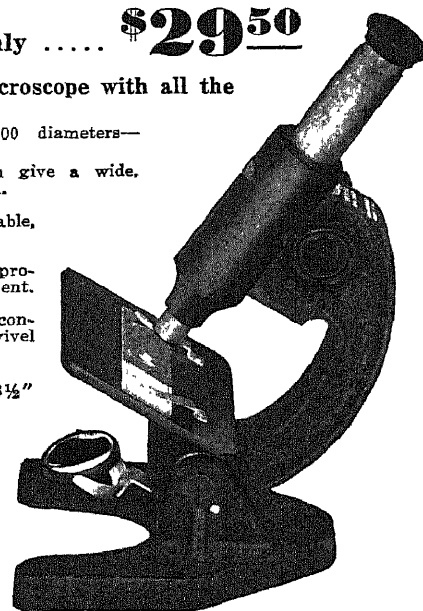
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❄️ **TUMBLERS FOR ICED DRINKS**, on the outsides of which moisture does not collect, look like glass but are made of a transparent plastic, and are double-walled with an air space between. This air space acts also as insulation, keeping the iced beverage cold longer as well as keeping the outer surface dry and warmer to the touch.

Science News Letter, September 18, 1948

❄️ **PORTABLE CLOTHES DRIER**, housed in a dress-suit-like case, contains an extensible rack of the ordinary hinged type, and an electric heating unit with fan fixed in the case. In use, the case is laid on the proper side, opened, the rack extended and the cord of the electric unit plugged in an ordinary electric outlet.

Science News Letter, September 18, 1948

❄️ **ELECTRIC WATER HEATER** for the home or laboratory has within it a magnesium rod to protect the tank itself from corrosion. Certain types of water that normally corrode and disintegrate tanks will, through electrolytic action, affect the magnesium rod instead.

Science News Letter, September 18, 1948

❄️ **HAMMERS** with plastic striking faces, which can be used without danger of mar-



ring surfaces of aluminum, other soft metals and highly polished wood, have the driving power of standard machinist hammers of equal weight. Their plastic faces, shown in the picture, are of a special

vinylite and are fitted over drop-forged heads.

Science News Letter, September 18, 1948

❄️ **BATHROOM TRAY** fits under the closet tank and catches and drains off tank drippings sometimes produced by condensation of moisture on the outside of the flush water container. Made of steel and aluminum with a white enamel finish, it is easily inserted.

Science News Letter, September 18, 1948

❄️ **RUBBER STALL**, a band to be worn on thumb or finger by filing clerks when sorting papers or by bank clerks counting currency, is made of pure gum rubber with an aluminum adjuster to regulate size. It eliminates the need of wetting the thumb and, being a band, causes little if any sweating.

Science News Letter, September 18, 1948

❄️ **UNICYCLE-RIDING** tiny clown, with an aluminum drum on which it rides, has magnetic shoes which follow a revolving magnet inside the drum. A crank on the side of the drum, not only revolves the magnet but also operates a music box so that the clown rides to music.

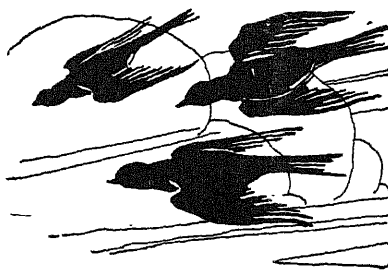
Science News Letter, September 18, 1948

Nature Ramblings by Frank Thorne

➤ **ANIMALS** prepare their escapes from the hardships of winter in an astonishingly wide variety of ways. Literal flight from the region where cold and want will prevail is perhaps the most conspicuous of these evasive actions. The autumn migrations of birds and their return in spring have been watched with wonder by all peoples since the dawn of history—and presumably even before that. Other winged creatures have their migrations also, though less is known about them because of greater difficulties in observation. Vast flocks of butterflies are often seen winging their way southward in autumn—often to apparently sure death over the sea. Bats, too, are said to migrate at least short distances to the caves where they will hibernate.

Hoofed animals also migrate, though their movements are more likely to be in altitude rather than in latitude. Elk, moose, bighorn, mountain goats and other big-game species usually spend the summer months in the higher mountains and pla-

Flight From Winter



teaus, where there are better pastures and fewer tormenting insects. When winter impends they come down into the valleys where there will be better shelter from storms and where shallower snows make movement and search for food less difficult. Some species also shift in latitude, notably the caribou and other animals of the sub-Arctic.

Hibernation is another common device. In varying degrees, it is used by animals ranging in size from mosquitoes to bears.

The winter sleep of some is profound and almost death-like. Ground-squirrels and other small mammals are limp, cold to the touch, and insensitive to noises, shaking and even pin-pricks when dug out of their winter burrows. Bears, on the other hand, are likely to be rather light sleepers, coming out of their dens for short prowls during spells of mild weather.

There is as much variety in hibernation among insects as there is among larger animals. Queen bumblebees, for example, dig in as snugly as the fabulous ground-hog, and sleep as profoundly. A few butterflies, notably the beautiful mourning-cloak, merely cling in some chink of bark or tangle of twigs, and flit about when mid-winter thaws raise the temperature at which insects can be active. Other lurkers that make no special preparations for winter sleep are occasional flies, some mosquitoes, and many kinds of spiders. You are apt to see these creatures on the move at almost any time during the winter.

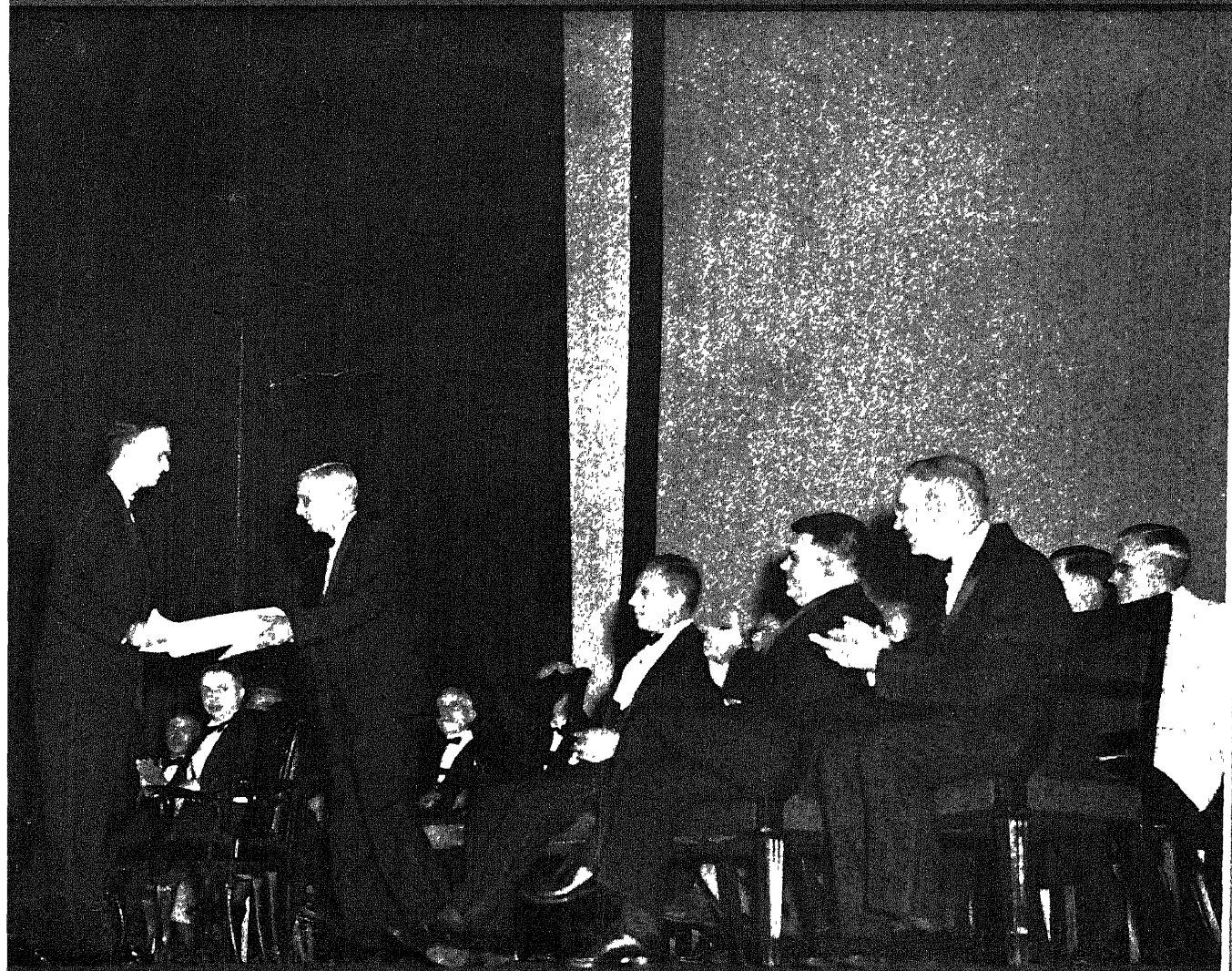
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SEPTEMBER 25, 1948

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Centennial Greetings

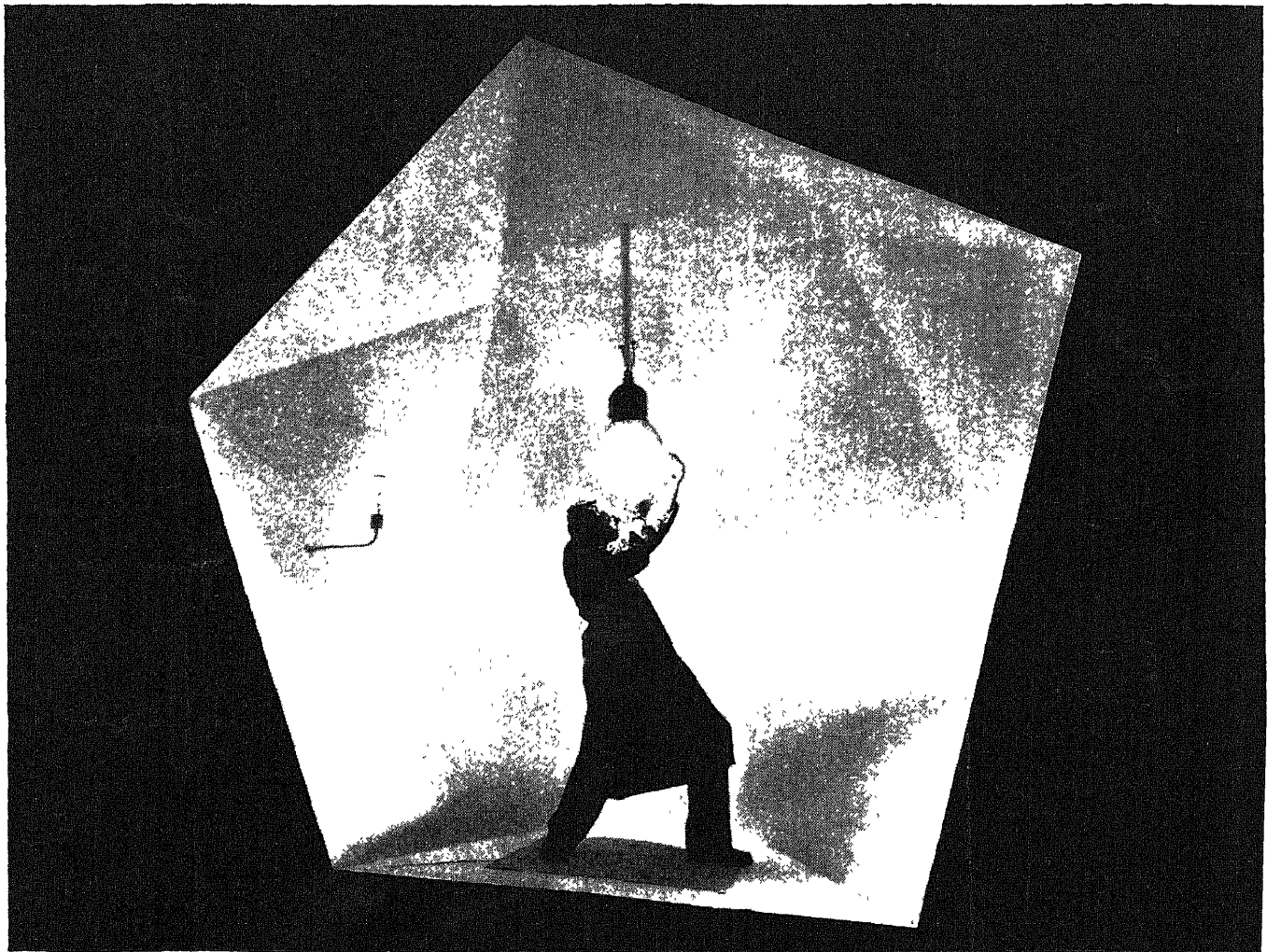
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Who needs a laboratory WITH 20 SIDES?

The answer is—a Westinghouse lighting engineer. The reason? So he can test street lighting units before they are put into production.

To measure the efficiency of street lights, research engineers at the Cleveland Lighting Plant designed and built the structure shown above. Known as an “icosahedron”, it has 20 snow-white walls which reflect light perfectly. Over-all efficiency is measured by a photocell behind a small window in one side.

In addition, to make sure that street lighting equipment will maintain the desired perform-

ance under actual operating conditions, it is installed by Westinghouse engineers on a specially-built street located near the plant. Only then, after a series of exhaustive tests . . . including exposure to severe weather . . . is the unit released for production.

This type of exacting research is not confined to the development of better street lighting units. It is standard procedure throughout the Westinghouse organization, whether the product is an electric iron or a steam turbine. You can be sure . . . if it's Westinghouse.

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PHYSICS

Mesons Explode in Body

You and everything else on earth are constantly bombarded with cosmic ray particles. This produces an explosion in your body every minute.

➤ **ONCE A MINUTE** even as you read this a meson explodes inside your body and produces three pieces of sub-atomic "shrapnel," one mysterious bullet of which could penetrate literally millions of miles of lead.

Hot on the trail of what happens to cosmic ray particles when they disappear near the earth's surface after having come in from outer space, Dr. John A. Wheeler, Princeton physicist, pictured for the American Association for the Advancement of Science, meeting in Washington, what happens.

Only one of the three pieces of the splitting of the meson (that's the cosmic ray particle) has been actually discovered—the electron, the unit of electricity. Another piece is the neutrino, a neutral particle that is almost not there at all (it has what the physicists call zero rest mass). This is the one that has such neutrality, small size and great energy that it could drive through solid lead for 200,000,000,000,000 miles! Since 1932 when Prof. W. Pauli conceived

it, scientists have been confident that it actually exists because they need it to explain what happens in the atomic world. But they despair of finding it.

The third particle is a neutral meson, undetected, but probably 50 times the weight of an electron, contrasted with the original meson of 200 times the electron's mass. It, too, is very energetic.

Everything on earth, including you and your friends, is bombarded constantly by this radiation from the depths of the universe. It has been going on for ages, so far as we know. The idea of the way particles die and give birth to other particles is new.

A Brazilian, Dr. Jayme Tiomno, aided Dr. Wheeler in his research, while Dr. W. Y. Chang on leave from Peiping University discovered upon cosmic ray photographs the strange appearance of an electron that bobbed up some distance from where a meson was stopped dead in its track.

Science News Letter, September 25, 1948



NEW ADMINISTRATIVE SECRETARY—Dr. Howard A. Meyerhoff, geologist at Smith College, Northampton, Mass., succeeds Dr. F. R. Moulton, as secretary of the A. A. A. S.

GENERAL SCIENCE

Administrative Secretary Of A.A.A.S. Appointed

➤ **DR. HOWARD A. MEYERHOFF**, professor of geology at Smith College, Northampton, Mass., has been appointed administrative secretary of the American Association for the Advancement of Science, to succeed Dr. Forest Ray Moulton, noted astronomer, who has held the post for the past 12 years.

A native of New York City, Dr. Meyerhoff was educated in the public schools of that city and completed his college training at the University of Illinois. He received master's and doctor's degrees in geology at Columbia University. Although he has been on the teaching staff of Smith College 24 years, he has been professionally active in the Caribbean, where he has served as geologist on the Scientific Survey of Puerto Rico and the Virgin Islands, consultant to the Dominican Republic and adviser on many public and private projects. He has recently returned from an Andean expedition in Argentina, which he directed.

The new administrative secretary brings an assortment of non-professional experience to his job. He was director of civilian defense in the Connecticut Valley region of Massachusetts during the war, and he also served as mediator and chief hearings officer on the National War Labor Board from 1942 to 1945. For nine years he was chairman of the Board of Directors of the Propper-McCallum Hosiery Company, and has been chairman of the Arbitration Board

GENETICS

Biochemistry of Genes

➤ **HOW CAN PEOPLE** and plants and animals be so much alike yet so different from even their closest kin?

Biochemical explanations for the strange workings of heredity were offered before the meeting in Washington of the American Association for the Advancement of Science by a series of speakers: Prof. Tracy M. Sonneborn of Indiana University, Prof. David Bonner of Yale University, Prof. Curt Stern of the University of California and Prof. Laurence H. Snyder of the University of Oklahoma.

Discussion of heredity, whether in men, mice or microbes, always revolves around genes. Nobody has ever seen a gene, just as nobody has ever seen electricity; scientists are sure of their existence because of the things they catch them doing.

Genes are submicroscopic units of living stuff that roost on or in the chromosomes, which are small rod-shaped or round bits of specialized protoplasm that can be seen with a microscope within the nuclei of cells. They are considered to be chemically highly potent, able to cause and control the production of various substances in the rest of the cell's protoplasm, which is known as cytoplasm.

These actions of the genes on the cyto-

plasm may determine the development of such body chemicals as the coloring matter in hair, skin and eyes, the various blood-group factors, and the enzymes and hormones that operate in digestion, respiration and other body functions. Abnormal action on the part of the genes may produce such inherited chemical disturbances as diabetes and gout.

Individual differences apparently arise through differences in the response of cytoplasm to the chemical influences of the genes. It even seems likely that some of these cytoplasmic entities which the genes help to set up become quasi-independent, producing types of hereditary transmission that are carried on mainly or altogether in the cytoplasm.

Tiny animals like fruitflies, and latterly even one-celled forms like certain molds and protozoa, have been favorite experimental material for this kind of research because they are inexpensive to maintain, breed readily and rapidly, and do not present such complexities in interpreting results as are presented in the uncontrolled matings of human beings. Eventually the results of these laboratory researches are often capable of expression in human terms.

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of the Maryland Drydock Company in Baltimore. For several years he has been active in the work of the Industrial Mineral Division of the American Institute of Mining and Metallurgical Engineers.

Dr. Meyerhoff has served the Association as secretary of the Section on Geology and

Geography from 1937-1940, and as executive secretary in 1945-46. He was also vice president in 1944. He plans to continue his academic duties at Smith College until June 1949, although he will take office in January, when Dr. Moulton retires.

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tor, Harvard College Observatory, Cambridge, Mass., retiring president of the A. A. A. S.; Dr. Elvin C. Stakman, University of Minnesota, president-elect 1949; Dr. E. U. Condon, Director, National Bureau of Standards, Washington, D. C.; and Dr. F. R. Moulton, Administrative Secretary, A. A. A. S., Washington, D. C.

Science News Letter, September 25, 1948

Letters To The Editor

New Clotting Factors

For the sake of historic accuracy concerning the discovery of new clotting factors (SNL, Sept. 4), it should be mentioned that in 1943 I discovered a hitherto unknown factor essential for prothrombin activity (AMERICAN JOURNAL OF PHYSIOLOGY, 140, 212, 1943) which undoubtedly is the same as the agent Dr. Paul A. Owren of Oslo, Norway, found one year later. In addition to this substance which I named the labile factor I have subsequently presented evidence that two additional factors are essential for prothrombin activity (AMERICAN JOURNAL OF PHYSIOLOGY, 151, 63, 1947).—Dr. Armand J. Quick, Professor of Biochemistry, Marquette University School of Medicine.

Rainbows within Rainbow

In the Colorado River Valley area numerous rainbows are seen during the spring and summer.

On Aug. 5 at 6:45 p. m. MST, my wife, family and I were attracted by a particularly bright rainbow. This rainbow was a conventional bow with red outside and green inside. However, three smaller concentric contiguous rainbows were inside the main rainbow. In addition, an inverse rainbow with green outside and red inside could be seen plainly about 15 degrees outside the main rainbow.

The brightness of the bow decreased considerably in the few minutes that my

daughter spent looking for my movie camera loaded with color film, so no photographs were taken.

Is such a sight unusual? What conditions must exist for these rainbows to be seen?—Tell Ertl, Rifle, Colo.

What a pity you did not get that camera in time as such a gorgeous array of rainbows—primary, secondary and several supernumerary bows—are seldom seen. Dr. W. J. Humphreys, formerly of the U. S. Weather Bureau, reports that he has seen supernumerary bows both inside the primary bow and outside the secondary one. He has spotted as many as half a dozen, crowded close together, inside the major rainbow. For such a spectacular display, Dr. Humphreys says the sunlight must be exceedingly bright and the rain heavy, but clear air between you and the rainbow.

On This Week's Cover

➤ IN COMMEMORATION of its centennial, the American Association for the Advancement of Science was offered congratulations from many foreign countries. On the cover Sir Oliver Franks, the British Ambassador, is shown offering a scroll from the British Association for the Advancement of Science to Dr. Edmund W. Sinnott, president of the association, on the opening evening of the week-long session. Seated left to right in the first row on the platform are: Dr. Harlow Shapley, Direc-

tor, Harvard College Observatory, Cambridge, Mass., retiring president of the A. A. A. S.; Dr. Elvin C. Stakman, University of Minnesota, president-elect 1949; Dr. E. U. Condon, Director, National Bureau of Standards, Washington, D. C.; and Dr. F. R. Moulton, Administrative Secretary, A. A. A. S., Washington, D. C.

Science News Letter, September 25, 1948

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From where may your hair have originated? p. 198

ASTRONOMY

Earth Due for Ice Age

Maybe in another million years the earth will again be dominated by ice. This will happen when the solar system becomes surrounded by a dense dust cloud.

➤ THE EARTH is due for a new Ice Age. It should happen in the next million years, but just when not even scientists were willing to predict at the American Association for the Advancement of Science meeting in Washington.

Ice will dominate the earth when the sun again becomes surrounded by a dense cloud of dust. Several times in the past million years dark nebulae in the solar system have brought glacial periods that changed the course of earthly life.

Dr. Donald H. Menzel, Harvard astronomer, advanced this new theory to the scientists.

The sun has been traversing a dark nebula, from which it emerged only 50,000 years ago, Dr. Menzel pictured. The denser portions of the nebula, by reflecting part of the sun's radiation back to the earth, produced the warm interglacial periods; the less-dense regions of the dark cloud gave the eras of ice accumulation.

If this theory is correct, Dr. Menzel stated, the outer fringes of the nebula are only about 20 million miles away, in the direction of the constellation Columba, the dove. Since the nebula as a whole may be quite thin compared with the average dark nebula, no clue is given to its presence by noticeable dimming of the light of distant stars.

Our present climate, variable as it is, is not representative of that experienced throughout geological history. The earth has undergone a number of separate and distinct periods of glaciation, with interim periods when the climate was appreciably warmer than at present. Magnolia trees, for instance, once flourished in Greenland.

Within the past million years the earth has experienced four separate periods of glaciation, Dr. Menzel pointed out. Great glaciers occurred simultaneously on all continents and probably in both hemispheres.

In the course of geological time, our sun has probably passed through many dark nebulae, the Harvard astronomer stated. A dark nebula is so tenuous that the material between the earth and the sun would exert a negligible effect on the amount of heat and light reaching us. But an extensive cloud, even if partially transparent, could scatter an appreciable amount of radiation back to the earth. The total sunlight reaching the earth might be increased five, ten, or even 15%, he suggested.

"At first sight, one might conclude that

the excess radiation would produce an effect just the opposite to that of an ice age," Dr. Menzel said. "A cold age, however, is not necessarily an ice age. An accumulation of ice and snow requires both high evaporation of water from the oceans and high transport of the moisture-laden air to the poles."

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GENERAL SCIENCE

Atomic Progress Endangered By Unfair Investigations

➤ ATOMIC PROGRESS is endangered in this country because atomic scientists are exposed to abuse, distortion and defamation through unfair investigations, Chairman David E. Lilienthal of the Atomic Energy Commission told the American Association for the Advancement of Science.

Although he mentioned no persons or

group, it was plain he was referring to the investigations being made by the House Un-American Activities Committee on the loyalty of certain American scientists.

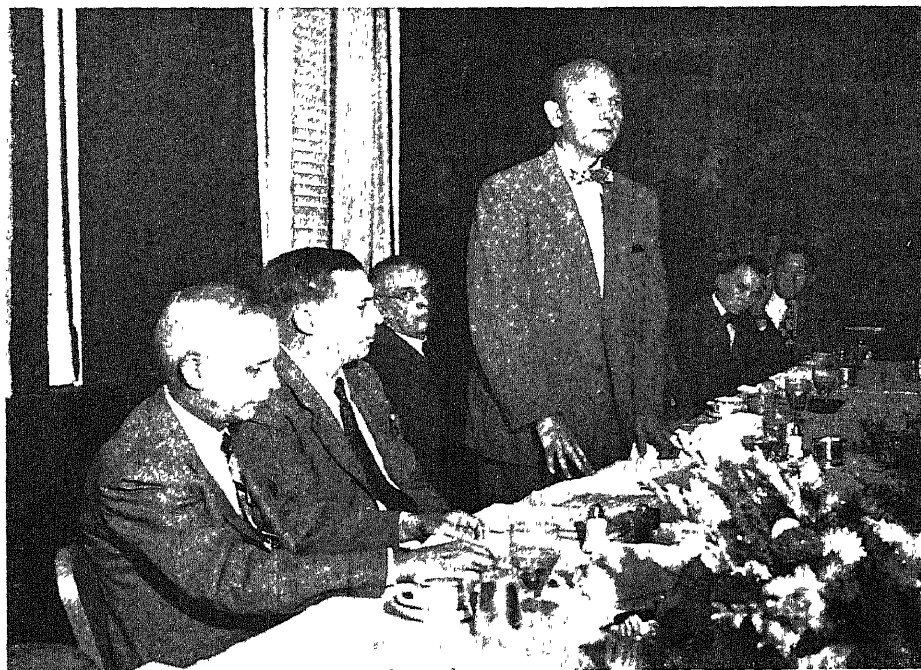
"It is ironic," he pointed out, "that this danger should become acute at the time when specific achievements have just been chalked up to the credit of this country's technical management forces engaged in atomic work—achievements, I may add, that are of importance to every man, woman and child in this country."

He called this a dangerous situation because "a healthy atomic energy program simply cannot stand still. It goes ahead, with greater and greater momentum, or it goes to pot."

Government employment has become in a very real sense a hazardous occupation, Mr. Lilienthal said. "If such damaging and painful occurrences should become common then inevitably self-respecting men will refuse in ever increasing numbers to work for their Government, and this Government, and therefore this Nation, will be in grievous trouble."

Our progress depends on having the very best qualified people in the United States, he said. "We must have more of them, and we must have them right away. Otherwise we face the imminent threat of stagnation. It is this that makes the present situation grave and ominous," Mr. Lilienthal declared.

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AAAS-GEORGE WESTINGHOUSE SCIENCE WRITING AWARDS—Chairman David E. Lilienthal of the Atomic Energy Commission is shown addressing AAAS members and science writers. Seated in foreground, left to right, are: Dr. Edmund W. Sinnott, president of the AAAS; Dr. Howard A. Meyerhoff, new administrative secretary; and George H. Bucher, vice-chairman of the Westinghouse Electric Corp.

CHEMISTRY

Man-Made Food Possible

➤ MAKING an artificial green plant out of colored dyes and chemicals is not too wild a dream and could save the world from eventual famine of food and energy.

Dr. Farrington Daniels of the University of Wisconsin rates the atomic energy development as a more difficult job than developing artificial photosynthesis, which means a factory that can use sunlight directly to build food out of carbon dioxide and water.

He told the American Association for the Advancement of Science in Washington that he would have guessed ten years ago that photosynthesis without plants would come before atomic energy.

Atomic energy won the race because \$2,000,000,000 was spent developing the chance discovery of fission of uranium. The investment in research upon photosynthesis has been negligible.

Dr. Daniels predicted for the future:

We shall eat wood in the future. Thousands of tons of yeast made from sugars converted from wood were used in Europe during the war. Trees and quick-growing bushes and grass grown on poor soil will furnish the wood necessary.

Weeds and algae from the oceans and

freshwater streams and lakes will be harvested for food.

Farm wastes will be converted into carbon monoxide and hydrogen and then processed into motor fuels, in factories located like creameries in local areas.

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Problem in Trip to Moon

➤ FOR THOSE who hope to fly to the moon and beyond with atomic power space ships, Prof. Eugene P. Wigner of Princeton has discouraging facts. The difficulty is getting rid of the waste heat from the tremendously concentrated nuclear energy source (the energy of fission corresponds to 600,000,000,000 degrees Centigrade of temperature). Computations show that an atomic engine rocket would barely be able to escape from the planet because of this heat problem.

For ocean ships, to which mobile atomic power will probably be first applied, the need of protecting against the intense radioactivity is more of a limitation, which Prof. Wigner believes can be overcome.

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holm, Director General of the World Health Organization, made this prediction at the American Association for the Advancement of Science meeting in Washington.

As a temporary relief measure to feed the present population of the world, WHO plans to pick out areas that are promising for food production but are held back by disease. Medical aid would then be given these disease-ridden areas, such as parts of India and Africa.

Dr. Chisholm recognized that this was just a temporary measure that would probably lead to an increase in population in these sections. He pointed out that, in time, population control will become inevitable.

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PSYCHOLOGY

Russia's Loud Vetoes Are Healthy, Psychiatrist Says

➤ IT IS a healthy sign to have Russia voicing her "nos" in public rather than reserving them for the diplomatic consulting room, a psychiatrist told the American Association for the Advancement of Science in Washington.

"It is wholesome for Russia to be expressing herself in Tass and Pravda and for that to be reported in our press," Dr. Kenneth E. Appel of the University of Pennsylvania declared.

He compared this public thrashing out of troubles to the work of the psychiatrist who helps the individual by allowing him to freely express all his accumulated fear and hostility. Discussion and understanding help the patient back to health.

"The same attitude that the wholesome parent adopts toward the belligerent or non-conforming child and psychiatry shows to the patient who is suffering from emotional excesses, should be adopted towards nations who are suffering from nationalistic, adolescent struggles in maturity," Dr. Appel advised.

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ECOLOGY

Cooperation with Nature

➤ MAN'S boasted "conquest of nature" must yield place to a cooperation with nature, if man is to survive, Dr. Stanley A. Cain of the Cranbrook Institute of Science warned, at the meeting in Washington of the American Association for the Advancement of Science.

We are used to thinking of land plants, whether crops, pastures or forests, as renewable resources, in contrast to such exhaustible resources as ores and oils. Such, however, is not necessarily the case, Dr. Cain declared. When man sweeps a forest off a mountainside and then lets fire ravage the thin soil, that forest will not be renewed in anything like human terms of time. Similarly, when man over-exploits cattle range or corn land, what remains will be unprofitable masses of weeds, or bare, gully-scarred clay, renewing nothing that man can use.

"We may be certain that a balance of nature will be attained; but we can not be certain that this balance will be one pleasing to man," he commented.

Efforts of conservation-minded groups have been largely ineffectual to date, the speaker pointed out, because such groups have put their main efforts into trying to influence politicians to pass (or reject) certain legislation, instead of devoting themselves to the broad education in con-

servation of the voters who elect (or reject) the politicians.

At the same session, Prof. G. E. Hutchinson of Yale University examined the effect of man's activities on the distribution and use of two chemical elements essential for life, carbon and phosphorus. In general, man's interference in the course of nature has been to intensify and make more continuous the exploitation of these indispensable elements, thereby rendering the inhabited part of the planet less fit for life.

"We have reached a point in this process when human assets are the only thing that we have in abundance," he declared. "Any future economy of abundance must be based on human ingenuity rather than on abundance of raw materials. The main obstacles to such a development are fear of war and a wrong orientation on the part of the public towards natural resources."

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POPULATION

"Standing Room Only" In Another 2,000 Years

➤ IN 2,000 YEARS there will be "standing room only" on earth if the population continues to increase at the present rate of about 2,000,000 a month. Dr. Brock Chis-

ZOOLOGY

Hair May Come from Warts Of Toad-Like Ancestor

➤ THE HAIRS of your head (and the whiskers on your chin, too, if you are a male) may be the descendants of warts that graced the hide of a toad-like ancestor, 100,000,000 years or so ago.

This suggestion was made before the meeting of the American Society of Zoologists in Washington, by Prof. Hans Elias of Middlesex University. Careful dissection of the warts of certain species of toads has disclosed structures basically resembling those of mammalian hair, he said. In the toad, these structures seem to be special sense organs.

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GENERAL SCIENCE

Truman's AAAS Address

"These are truths that every scientist knows. They are truths that the American people need to understand," he said, referring to unfair attacks on scientists.

The complete text of the A. A. A. S. address of President Harry Truman on Sept. 13 follows:

➤ I AM DEEPLY HONORED in being with you tonight on the one hundredth anniversary of the founding of the American Association for the Advancement of Science. As President of the United States, I welcome you to Washington.

In the 100 years since this Association was organized, science has helped transform the United States into the most productive nation in the world. I know that in your meetings this week you will be looking back over the progress of American science in the past century. I also know that you are much more interested in looking into the future.

You are looking forward, I know, because we stand at this moment at the threshold of revolutionary developments. Scientific research daily becomes more important to our agriculture, our industry, and our health. The members of this Association know better than I what developments to expect in the years ahead in physics, in chemistry, in biology and the other sciences, but I am certain of this—that science will change our lives in the century ahead even more than it has changed them in the hundred years just past.

Science and National Policy

I hope you will also be thinking about the relationship between science and our national policy.

Two years ago, I appointed a Scientific Research Board. Its report, entitled *SCIENCE AND PUBLIC POLICY*, was submitted last fall. The report stressed the importance of science to our national welfare, and it contained a number of important recommendations.

The most important were these:

First, we should double our total public and private allocations of funds to the sciences. We are now devoting, through Federal and private expenditure, little more than one billion dollars for research and development per year. With a national income of more than \$200 billion annually, the Board felt that we should devote at least \$2 billion to scientific research and development each year.

Second, greater emphasis should be placed on basic research and on medical research.

Third, a National Science Foundation should be established.

Fourth, more aid should be granted to

the universities, both for student scholarships and for research facilities.

Fifth, the work of the research agencies of the Federal Government should be better financed and coordinated.

I hope that you have been weighing these recommendations carefully, and that if you agree with me that they are sound, you will consider how they can be made effective national policies.

I know that you are also deeply concerned with the relationship of science to our national defense and security. Three years ago, when the fighting stopped, all of us were eager to return to our peacetime pursuits. The first thought of a great many of us was how to translate our wartime advances in scientific knowledge into better standards of living.

It is an unfortunate fact, however, that the peace we hoped for has not come quickly. We are still living in hazardous times. We are required to give unremitting

thought to the defense of the United States at a period when defense has become incredibly more difficult. American scientists must, like all the rest of our citizens, devote a part of their strength and skill to keeping the Nation strong. At a time when we hoped our scientific efforts could be directed almost exclusively to improving the well-being of our people, we must, instead, make unprecedented peacetime efforts to maintain our military strength. For we have learned—we have learned the hard and bitter way—that we cannot hope for lasting peace with justice if we do not remain strong in the cause of peace.

Leadership in Science

If we are to maintain the leadership in science that is essential to national strength, we must vigorously press ahead in research. There is one simple axiom on which this thought is based. The secrets of nature are not our monopoly. Any nation that is willing and able to make the effort can learn the secrets that we have learned. Such a nation may, indeed, discover new facts of nature we have not yet discovered.

Our problem, therefore, is not a static one of preserving what we have. Our problem is to continue to engage in pure—or fundamental—research in all scientific fields. Such research alone leads to striking developments that mean leadership. Yet it

(Continued on page 203)



PHYSICISTS PUT THEIR HEADS TOGETHER—These professors of physics attended the A. A. A. S. meeting in Washington to report recent advances to the scientists gathered there. They are, seated left to right: Dr. C. M. G. Lattes, University of California; and Dr. John A. Wheeler, Princeton U. Standing, left to right: Dr. Jayme Tiomno, Princeton U.; Dr. Willis E. Lamb and Dr. I. I. Rabi, of Columbia U. (See p. 195)

AGRICULTURE

More Food Will Come with Better Knowledge of Soil

➤ **BETTER-FED PEOPLE** through better understanding of soil types and their productive capacities was the program called for at the meeting in Washington of the American Association for the Advancement of Science, by Prof. William A. Albrecht of the University of Missouri.

Early waves of pioneer settlers, and even the bison they drove before them, unconsciously recognized something of the sort, the speaker pointed out. The pioneers turned their backs on the thin, cut-over soils of the Atlantic seaboard and pushed across the heavy clays of the eastern interior out onto the rich prairie grasslands, which the bison had always preferred.

Now, with mechanized, one-crop farming, we are in danger of producing little but energy-foods (sugars and starches), neglecting the high-protein ration necessary for the best health, Prof. Albrecht declared. A more thorough study of crop ecology based on soils, and a more varied agriculture stressing protein production, he declared, is our greatest present land-use need.

There is no inherent, instinctive basis for our choice of foods, Dr. Margaret Mead, anthropologist of the American Museum of Natural History told the meeting. We learn what to like from our parents and our associates, and our preferences are subject to change from generation to generation. This she regards as fortunate, because it is probable that present and future nutritional researches will turn up many things that will be good for us—and we shall have to learn to like them.

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GEOLOGY

Fossils Aid Temperature Study of Ancient Seas

➤ **A THERMOMETER** that can reach back into the history of the earth many millions of years and tell the temperature of seas that existed in those ancient days has been discovered.

This thermometer is read by determining the amount of the heavy variety of oxygen in the fossil skeletons of squid-like animals found in the famous chalk cliffs of Dover, Dr. Harold C. Urey, of the University of Chicago's Institute of Nuclear Physics, and Nobelist for his discovery of heavy hydrogen, told the American Association for the Advancement of Science in Washington.

One atom of oxygen 18 times the weight of hydrogen is found in water to every 500 atoms of the ordinary kind of oxygen 16. But the ratio of the two isotopes of oxygen is different after it is used by coral or shell fish in building up its calcium carbonate skeleton. There is more of the heavy sort in the animals than in the sea in which

they lived. And the warmer the ocean the more heavier oxygen.

Dr. Urey and his fellow investigators saw that this meant that the fossils could be used as a very durable thermometer that has been buried for millions upon millions of years. They obtained from museums fossils of belemnite oysters, and other creatures from the Upper Cretaceous chalk deposits in England.

The mass spectrometer, instrument for measuring the weight of atoms, had to be improved until its precision was six times what it was.

Not too definite are the results, but it seems that the 60,000,000 to 70,000,000 years old fossils once lived in a sea that was between 64 and 81 degrees Fahrenheit. This fits in very well with the geological evidence that the ancient seas around what is now Britain were as warm as the tropic oceans of today.

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BOTANY

Tiny American Wildflower Has Giant Relatives

➤ **GENTIANAS** are not always tiny blue wildflowers. Fifteen-foot, giant gentians with flowers ranging from pale green to golden yellow have been found in the Andes of southern Colombia and northern Ecuador. They have been found as far north as Costa Rica and as far south as Bolivia.

There are about 30 varieties of these gentian-trees in the rainy mountain forests of Latin America, explained Joseph Ewan, of Tulane University, in a report issued by the Smithsonian Institution in Washington.

The gentian family includes a great many widely differing members, and only a botanist would recognize some of the more fantastic relatives. More than 400 kinds, most of them small wild perennials, are known to botanists.

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GENERAL SCIENCE

Largest X-Ray Development Lab Honors Scientist

➤ **THE LARGEST X-RAY** development laboratory in the world has been dedicated in Milwaukee by the General Electric X-ray Corporation.

The new William D. Coolidge laboratory is named in honor of a pioneer scientist in the X-ray field. Dr. Coolidge is director emeritus of the General Electric Research Laboratory, Schenectady, N. Y.

In addition to major contributions to X-ray equipment, Dr. Coolidge is also credited with an important role in the development of the modern incandescent electric light bulb. His work on ductile tungsten in 1908 paved the way for advances in both light bulbs and automobile ignition contacts.

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IN SCIENCE

PSYCHOLOGY

Election Winner Is More Popular After Victory

➤ **NOT MANY PEOPLE** take polls after the election is over. But, if they did, they would find a significant shift to the support of the winning candidate.

Such an after-election poll was actually conducted after Roosevelt was chosen in the last presidential election. More than 2,000 persons were interviewed before the election and the same 2,000 were interviewed again after the election was over. Results were reported to the American Psychological Association in Boston by Dr. Sheldon J. Korchin, of the Veterans Administration Mental Hygiene Clinic in Philadelphia.

Democrats, it was found, became more intense in support of Roosevelt. Republicans moved toward neutrality. Those who, before the election, had been undecided, moved in a pro-Democratic direction.

With each passing year, it was also found, there are more people who "remember" having voted for the winning candidate.

This shifting of support to the choice of the majority is a characteristic of the American culture, Dr. Korchin commented. It is, he said, what gives stability to the American political system.

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BIOCHEMISTRY

Find Why Streptomycin Fails Against Lung TB

➤ **WHY THE WONDER DRUG**, streptomycin, gives disappointing results when used to fight pulmonary or lung tuberculosis seems to have been discovered.

The sputum—spit, it is commonly called—protects the germs, tubercle bacilli, against the streptomycin which will destroy them if it can get at them.

When the tubercle bacilli lie on surface lesions such as ulcers of the larynx and vocal cords, the response to the treatment is dramatic, Dr. Herta Schwabacher of the British Ministry of Health Laboratory has reported in *NATURE* (Aug. 28). But tuberculosis of the lungs is proving resistant to streptomycin treatment.

The inhibiting effect may be either mechanical or chemical, Dr. Schwabacher believes, since it is not the result of acid reaction.

No beneficial effects from treating whooping cough with streptomycin have been obtained, presumably for the same reason.

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THE FIELDS

ANTHROPOLOGY

Ghost-Haunted Boars Cause Native Wars

➤ NEW GUINEA NATIVES go to war because they are afraid of ghosts.

Both male and female ghosts are hable to raise all sorts of havoc unless properly appeased with a war, the natives believe. This strange cause for war was described by Dr. R. F. Fortune, British anthropologist, to the British Association for the Advancement of Science, meeting in Brighton, England.

The natives may fight in order to send enemies of their dead male friends to the other world. Unless this is done, the superstition holds, the ghosts of their friends will be unhappy. Then, the ghosts are likely to get inside the bodies of wild boars.

Boars possessed by male ghosts run wild, breaking down fences and destroying crops.

Another New Guinea tradition calls for the use of military power to revenge marital unfaithfulness. Ghosts figure in this, too. Ghosts of women whose wrongs have not been avenged may possess married women and persuade them to desert their husbands for lovers over the border.

Dr. Fortune's studies supported the theory of the late Sir James Frazer, famed British anthropologist. Sir James held that primitive warfare arises from a desire to appease the ghosts of friends by sending the souls of enemies to another world. Religious duties and military duties have been linked together from pagan to modern times, he believed.

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PSYCHOLOGY

People in This Glass House Are Free from Odors

➤ AN ODOR-FREE double glass house for testing the ability to detect smells was described to the American Psychological Association in Boston.

The observer who is having his sense of smell tested must first take a bath and then he is permitted to enter the antechamber of the glass house. There he is dressed in an odorless envelope after which he can go into the inner room.

Experiments with this glass double chamber were reported by Drs. Dean Foster, of Joseph E. Seagram and Sons, and Karl M. Dallenbach, of Cornell University.

The investigators can control completely the air permitted to enter the "Olfactorium," as it is called. It can be pure, odor-free air or odor-bearing air of known humidity, temperature and pressure. The chamber is equipped with air purification

and control apparatuses. Within the olfactorium the scientists can know exactly what the observer may be expected to smell.

Previous experiments on smell, they point out, have carefully controlled the physical and chemical qualities of the smelly substances, but have paid no attention to the surroundings. The results, they comment, are comparable to tests of hearing conducted on a busy street corner.

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ELECTRONICS

Television Receiving Tube Is Now Made of Metal

➤ A TELEVISION RECEIVING TUBE made largely of metal, demonstrated in New York to a group of scientists, is said to be the first successful tube of the type which can be manufactured on a continuous production basis. It is a 16-inch tube for direct-view home receiving sets.

Metal tubes have several advantages over those made entirely of glass, Samuel Kagan, president of Tel-O-Tube Corporation of America, stated. The development was made by this company. Previous attempts to make tubes of this sort have been none too successful because of difficulties encountered in attempting to join glass to metal in an air-tight seal.

The major portion of the outer shell of the new tube consists of a cone of spun chrome-steel alloy. Only the image screen and the neck or stem which houses the cathode-ray gun are made of glass. These are sealed by a secret process to the metal cone, which has the same rate of expansion as the glass.

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AERONAUTICS

Jet on Plane Supplements Conventional Engines

➤ CONVENTIONAL ENGINES plus jet propulsion feature a new Navy plane. It is designed for carrier operations. Two reciprocating engines are located under its wings, and a turbo-jet engine is in the tail of the fuselage.

In normal operations, the conventional engines will be used. When added speed is needed, the jet can be cut in. The reciprocating engines are Pratt and Whitney Wasp Majors, and the jet is a GE-Allison turbo-jet.

This new plane, which has already completed initial flight tests, was constructed by North American Aircraft Company, Los Angeles. In service it will be known as the XAJ-1. It carries a crew of three, has tricycle landing gear, high wing, and four-bladed propellers. Outer wing panels fold inboard and the vertical tail folds onto the right surface of the horizontal tail.

Performance figures are not yet available, but it will be considerably faster and able to carry a heavier bomb load than present carrier types.

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PSYCHOLOGY

Childhood Morale Can Help Prevent or Control Fear

➤ TO CONTROL OR PREVENT terror, it is necessary to lay the foundations of morale in childhood, the British Association for the Advancement of Science, meeting in Brighton, England, learned from a psychologist, Mrs. F. M. Austin.

Neurotic fear or imagined terrors were not what Mrs. Austin referred to. She discussed the normal fear caused by such things as the noise of a dive bomber attacking, the feeling of sudden dropping in an airplane, the sensation of suffocation or loss of security.

Here are some of the preventives observed in action in wartime England: Self-assertion, pugnacity, curiosity, desire to be with others, protectiveness, reliance on others, the doing of something, experience, knowledge, habit.

There are other, less tangible influences, that help a person to control his panic. They are, Mrs. Austin said, ideals, ambitions, self-approval, sense of duty, and social approval.

These influences interact, she said. Sometimes one is dominant, sometimes another. The way an adult behaves when face to face with great danger depends, she said, upon the integration and balance of his personality.

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PSYCHIATRY

Sadism, Masochism Belong In Same Brain-Sick Cycle

➤ SADISM AND MASOCHISM, the desire to hurt and the yearning to be hurt, are opposite faces of the same bad emotional coin. The same emotionally disturbed individual is apt to be both sadist and masochist by turns, Dr. Eilhard von Domarus of the Association for the Advancement of Psychotherapy told scientists meeting in Washington for a special symposium on cooperation and conflict among living organisms.

Both tendencies exist in the upset individual at the same time, the speaker explained, but we call him sadist or masochist according to which happens to be predominant at the moment. He may start out as a sadist, hurting others to compensate for some lack or frustration in himself. Then a sense of guilt or shame at his cruelty overcomes him, and he exposes himself to hurt or humiliation to compensate for that. Then he may become a sadist again—and the cycle repeats itself without end. In extreme cases, the sadist may actually kill and eat his victim.

In organized societies, Dr. von Domarus continued, democracy tends to promote the healthy, normal mental state of mind termed symbiosis. Autocracies produce the unhappy sadism-masochism cycle.

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ASTRONOMY

Taurus Shines in East

Appearance of heavens in October evenings heralds the coming of winter. A guide to autumn constellations is the triangle formed by Vega, Deneb and Altair.

By JAMES STOKLEY

➤ WITH TAURUS, the bull, in the eastern evening sky, the appearance of the heavens brings to our attention the fact that winter is but a couple of months off. For Taurus is one of the constellations that shine so conspicuously in the south on the evenings of January and February.

Its position (at 10:00 p. m., your own kind of standard time, at the first of the month, and an hour earlier on the 15th) is shown on the accompanying maps. Low in the northeast is shown Aldebaran, the brightest star of Taurus. Next, to the left, appears Auriga, the charioteer, with first magnitude Capella. Above Aldebaran is the little cluster of stars known as the Pleiades, the "seven sisters" of mythology.

Toward the west we can see three other stars of the first magnitude. One, shown on the map of the northern half of the sky, is Vega, in Lyra, the lyre. Above this is Cygnus, the swan, with brilliant Deneb as its brightest orb. To the left (on the southern map) we find Altair, marking Aquila, the eagle. These three stars—Vega, Deneb and Altair—form a large triangle in the sky which is a good figure to know if you want to learn the autumn constellations.

Though it does not contain any first magnitude stars, another characteristic figure that makes a good guide in finding one's way in the sky, is high in the south, mainly in Pegasus, the winged horse. This is the "great square," of which the upper left-hand star is Alpheratz, in the constellation of Andromeda, which represents a mythical princess. Below and to the left of the square we see the fishes, Pisces, one of the constellations of the zodiac, through which the sun, moon and planets seem to move. Aquarius, the water carrier, next to the right, is also one of them.

Fish Prominent in South

Below this group is Piscis Austrinus, the southern fish, with another first magnitude star, Fomalhaut, now as high as it ever rises in these northern latitudes. This fish is a prominent constellation in the southern hemisphere, where it comes overhead.

Brighter, even, than any of the stars mentioned is another object visible in the southwest, in the constellation of Ophiuchus, the serpent-bearer. This is the largest of the planets that, like the earth, revolve about the sun. It is Jupiter, with a diameter of 88,700 miles, or nearly 11 times that of the earth.

Though Jupiter is the only planet now

visible in the evening sky, to the east, rising a few hours before the sun in the constellation of Leo, the lion, Venus shines. Of magnitude minus 3.7, it greatly exceeds any other star or planet. To the east of Venus, at the beginning of the month, and about a sixty-fourth as bright, is the planet Saturn. Venus passes it on Oct. 8, two days after it passes the star Regulus.

The month of October brings two eclipses, though one just barely gets under the wire to start before the last day of the month ends, and will not be visible from the United States at all.

The shadow of the earth, and that of the moon as well, has two parts. The dark, inner core, called the umbra, is the region from which the planet completely hides the sun. Around this is a larger region, called the penumbra, where the sun is only partially hidden. When the moon's umbra strikes the surface of the earth, there is a total solar eclipse, visible along the path which it traces as it moves toward the east. In the larger area covered by the penumbra there is a partial eclipse.

Track of Partial Eclipse

During the night of Oct. 31, while the sun is below the horizon for people in North America, the moon's shadow thus traces out an eclipse track starting in Kenya, East Africa, and crossing the Indian and South Pacific Oceans, ending southeast of Australia. The region covered by the penumbra, where there is a partial eclipse, includes south and east Africa, the Indian Ocean, Australia and New Zealand. The first small partial eclipse is visible from a point in Africa, in Ethiopia, at 10:19 p. m.,

EST, so that is why it manages to get into a description of astronomical events in October.

The earlier eclipse, however, is visible from the United States, and concerns the moon. On the evening of Oct. 17 our satellite gets entirely into the earth's penumbra, though not into the umbra at all. Consequently, this is called a penumbral eclipse. Since at no time will the sun be completely hidden from any part of the moon, it will not get as dark as at some lunar eclipses. However, at its height, enough sunlight should be cut off to give the moon, then in the full phase, a decidedly pale appearance.

Time of Greatest Effect

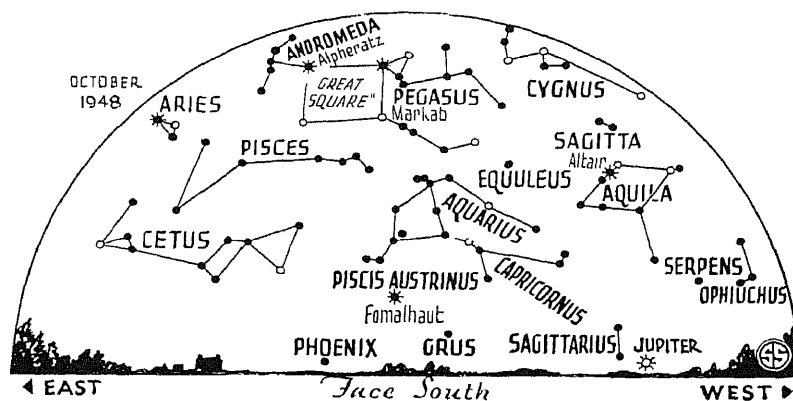
At 7:13 p. m., EST, the moon starts entering the outer shadow of the earth, and beginning at 9:10 it is completely immersed, most deeply at 9:35. By this time, the effect on the moon should be greatest. At 10:00 p. m. the moon starts to leave the penumbra and at 11:57 it is completely out of it.

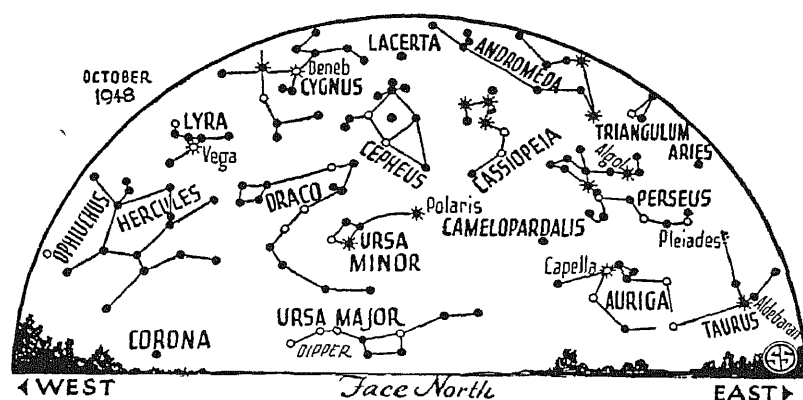
Time Table for October

Oct.	EST	
1	11:00 a. m.	Moon nearest, distance 222,300 miles
2	2:42 p. m.	New moon
5	1:13 p. m.	Moon passes Mars
7	9:08 p. m.	Moon passes Jupiter
8	3:00 p. m.	Venus passes Saturn
9	5:10 p. m.	Moon in first quarter
13	4:00 p. m.	Moon farthest, distance 251,900 miles
17	9:23 p. m.	Full moon, penumbral lunar eclipse
22	early a. m.	Meteors of Orionid shower, radiating from constellation Orion
25	8:41 p. m.	Moon in last quarter
27	12:21 p. m.	Moon passes Saturn
29	2:02 a. m.	Moon passes Venus
	3:00 p. m.	Moon nearest, distance 226,200 miles

Subtract one hour for CT, two hours for MT, and three for PT.

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Truman Address

(Continued from page 199)

is precisely in this area that we, as a nation, have been weakest. We have been strong in applied science and in technology, but in the past we have relied strongly on Europe for basic knowledge.

Pure research is arduous, demanding, and difficult. It requires unusual intellectual powers. It requires extensive and specialized training. It requires intense concentration, possible only when all the faculties of the scientist are brought to bear on a problem, with no disturbances or distractions.

Some of the fundamental research necessary to our national interest is being undertaken by the Federal Government. The Government has, I believe, two obligations in connection with this research if we are to obtain the results we hope for. First, it must provide truly adequate funds and facilities. Second, it must provide the working atmosphere in which research progress is possible.

Program in Many Fields

As to the first point, the Government is developing impressive programs in many scientific fields. Fundamental research is being carried on for the National Military Establishment in the laboratories of the armed forces, of industry, and of our universities. The Atomic Energy Commission has been pushing its extensive research. The National Advisory Committee for Aeronautics has expanded its many aeronautical developments. The Federal Security Agency has engaged in extensive medical studies, in its own laboratories like the National Institutes of Health, and through grants to colleges and universities. Other Federal agencies, such as the Departments of Commerce, of Agriculture, and of the Interior, have pursued vigorous programs. The Inter-Departmental Committee on Scientific Research and Development, appointed by me last March, aids in coordinating the Government's many research programs. I sincerely hope that these programs will be further developed and coordinated by the early passage of a National Science Foundation bill.

The second obligation of the Federal Government in connection with basic research is to provide working conditions under which scientists will be encouraged to work for the Government. Scientists do not want to work in ivory towers, but they do want to work in an atmosphere free from suspicion, personal insult, or politically motivated attacks. It is highly unfortunate that we have not been able to maintain the proper conditions for best scientific work. This failure has grave implications for our national security and welfare.

There are some politicians who are under the impression that scientific knowledge belongs only to them. They seem to feel that it is dangerous to let scientists know anything about scientific developments in this country.

Telegram from Scientists

This situation has been of increasing concern to me. It was highlighted by a telegram I received last week from eight distinguished scientists. These men expressed their alarm at the deterioration of relations between scientists and the Government because of the frequent attacks which have been made on scientists in the ostensible name of security. The telegram points out that the actions of certain groups are "creating an atmosphere that makes men shun Government work," and that the Federal Government is losing the services of excellent scientists because they have been looked upon from certain quarters as "men not to be trusted." The telegram points out that scientists fully appreciate the need for sensible security measures. But scientists very understandably are reluctant to work where they are subject "to the possibility of smears that may ruin them professionally for life."

That telegram was a balanced and sober presentation of a vital problem that concerns every American.

Continuous research by our best scientists is the key to American scientific leadership and true national security. This indispensable work may be made impossible by the creation of an atmosphere in which no man feels safe against the public airing of unfounded rumors, gossip and vilification. Such an atmosphere is un-American. It is

the climate of a totalitarian country in which scientists are expected to change their theories to match changes in the police state's propaganda line.

I hardly need remind this Association that it is primarily to scientists that we owe the existence of our atomic energy enterprise.

It was the scientists who first saw the possibility of an atomic bomb. It was the scientists who proved the possibility. It was the scientists who first saw the need of security measures, and who on their own initiative clamped down a tight lid of secrecy on all experiments. It must not be forgotten for a moment, and certainly it must not be obscured by any smear campaign, that but for the scientists we would have no atomic energy program.

We are only in the beginnings of the atomic age. The knowledge that we now have is but a fraction of the knowledge we must get, whether for peaceful uses or for national defense. We must depend on intensive research to acquire the further knowledge we need. We cannot drive scientists into our laboratories, but, if we tolerate reckless or unfair attacks, we can certainly drive them out.

These are truths that every scientist knows. They are truths that the American people need to understand.

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Deciduous trees with small leaves thrive best in *high-wind areas*; the small leaves spin in the wind and stay on the tree, while large leaves of other trees are pulled off.

A disease that appears to be native to the soybean belt of the United States called *brown stem rust*, is caused by a fungus that has the peculiarity of growing rapidly only in rather cool weather.

Six varieties of *trees*, used to repair 1944 hurricane damage, have been found to do best in the salt spray and strong winds on Cape Cod, Mass.; they are honey locust, Wisconsin golden willow, Austrian pine, Japanese black pine, Aspiratte spruce and the native pitch pine.

Science has no political affiliation. Concern for our national security is non-partisan. Sober recognition of scientific research as the basis of our future national security should certainly be non-partisan. All Americans have a solemn obligation to avoid those methods and procedures which are impeding scientific research—whether adopted mistakenly with good intent, or advocated in the name of security by men with other axes to grind.

My emphasis tonight has been on the physical and biological sciences. These are obviously in the forefront in terms of our industry and technology. But the social sciences and related fields are at least as important in the present stage of human affairs.

The physical sciences offer us tangible goods; the biological sciences, tangible

cures. The social sciences offer us better ways of organizing our lives. I have high hopes, as our knowledge in these fields increases, that the social sciences will enable us to escape from those habits and thoughts which have resulted in so much strife and tragedy.

Now and in the years ahead, we need more than anything else the honest and uncompromising common-sense of science. Science means a method of thought. That method is characterized by open-mindedness, honesty, perseverance, and, above all, by an unflinching passion for knowledge and truth. When more of the peoples of the world have learned the ways of thought of the scientist, we shall have better reason to expect lasting peace and a fuller life for all.

Science News Letter, September 25, 1948

TECHNOLOGY

Dishtowels from Asbestos

➤ **FLUFFY FIBERS** of the mineral asbestos are being woven with cotton to produce a truly absorbent dishtowel.

The fabric is 20% asbestos and 80% cotton. Tiny bundles of asbestos fibers in the cloth blot up the water.

The fabric is dyed after being woven, but only the cotton fibers absorb the color. Thus the solid-colored towels, sold under the trade name of Carosel, are decorated with tiny flecks of white—the undyed asbestos.

Fire-resistant cloth is also made of asbestos and cotton fibers. This material contains 80% asbestos, 20% cotton—just the reverse proportions of the dishtowel fabric.

Useful in fighting fires, this material serves in the home as ironing board covers and “slippers” for hot irons. The fabric, which weighs only 22 ounces per square yard, is used in electrical insulation, laundry mangle and press covers, fireproof draperies and industrial rubber goods.

Cotton is mixed with the fireproof asbestos to give the fabric a firmer construction. Slippery asbestos fibers do not hold together well, so cotton is employed to anchor them in place. The cotton is combustible, but because of the large percentage of asbestos fibers the fabric will not support a flame for more than an instant or so.

The strength of cotton yarn is almost doubled by a new chemical and mechanical treatment. Any type of conventional cotton ply yarn can be used. The chemical treatment works on the natural waxes of the cotton fibers to reduce their tendency to slip over each other; a stretching operation further increases the strength of the cotton. The yarn's tensile strength is improved as much as 70% to 90%.

This extra strength makes the yarn especially valuable for use in rubber-fabric conveyor belts, high-pressure hose and other industrial rubber products where high

strength and low stretch are important.

Some yarns are made to stretch, then snap back into shape. These elastic yarns are becoming increasingly popular for home use. Buttons can withstand sudden tugs when sewed with elastic yarn. Ruffling for curtains can be shirred and little girls' dresses smocked on the sewing machine when this thread is used.

The base of the elastic yarn is a rubber core, around which threads are wound. At least two threads are always applied, wound in opposite directions, to balance the yarn and keep it from twisting.

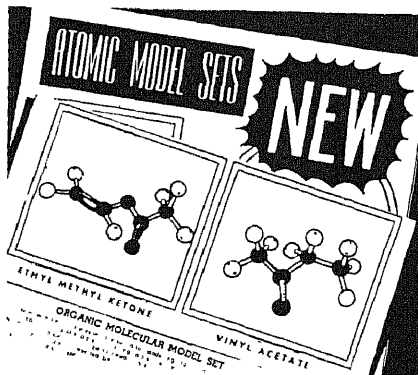
Samples of these specialized yarns and textiles have been collected for you through the cooperation of the United States Rubber Company and Science Service. Also included among the nine specimens are an elastic yarn only 1/125 of an inch in diameter and a fabric of permanent starchiness.

These specimens, with a leaflet telling how they were made and experiments you can perform with them, may be secured by sending 50 cents to Science Service, 1719 N St., N. W., Washington 6, D. C. Just ask for unit No. 95, the Specialized Textiles Unit of THINGS of science.

Science News Letter, September 25, 1948

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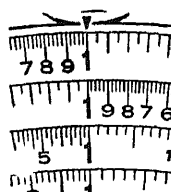
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BIOCHEMISTRY

Plants Use Weapons

➤ PLANTS of all kinds and sizes, from bacteria to trees, use chemical weapons in their struggle for living space in a crowded world. How they do it was developed in discussions at the opening session of a special symposium on conflict and cooperation among organisms, held in Washington.

Chemical competition of this kind is not known to be common among the higher plants; species that are chemically unfriendly to their neighbors generally betray that fact by the sparseness of other plant growth in their vicinity. Prof. James Bonner of the California Institute of Technology told of a plant-killing substance produced in the leaves of wormwood, the shrub used in flavoring such liquors as vermouth and absinthe. Of a large number of weeds, only one species of chickweed and one of jimsonweed could tolerate it. A Southwestern shrub with yellow daisy-like flowers, known as encelia or bush sunflower, secretes a poison so deadly to other plants that a small handful of its dead leaves would kill potted tomato plants.

Some plants produce their chemical weapons through their roots instead of their leaves. Prof. Paul Sears of Oberlin College joined Prof. Bonner in calling attention to the fact that few plants, other than grasses, will grow on soil underlain by the roots of black walnut trees.

In some instances these root secretions are poisonous to seedlings of the species that produce them. Prof. Bonner called attention to the common cultivated brome grass as a case in point.

Science News Letter, September 25, 1948

Molds Versus Bacteria

➤ CHEMICAL competition appears to be very widespread among bacteria, molds and other lower plant forms, Prof. Robertson Pratt of the University of California stated. Lately man has been taking advantage of some of these substances, like penicillin and streptomycin, for his own purposes.

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Prof. Pratt pointed out that some bacterial species meet the attack of these antibiotics by quickly evolving resistant strains. On the other hand, it has been observed that bacteria dying of penicillin poisoning may do a disservice to their survivors by releasing a growth-promoting substance into the medium, that renders the remaining bacteria more susceptible.

Science News Letter, September 25, 1948

Competition Not Evil

➤ IN DISCUSSING competition among plants, Prof. Sears cautioned against attaching to such conflict the "overtone of evil" which we Occidentals are apt to read into human strife. Young trees in a forest, shading each other out until finally only one remains where scores or hundreds started, are only carrying out a natural and necessary thinning process.

There is even something resembling cooperation between trees and shrubs, where Eastern forest tries to invade Western prairie. Prof. Sears stated that the trees do not go out directly into the grassland, but that the forest has a border of shrubby growth such as sumac, blackberry and rabbit-brush, that constantly pushes ahead as a kind of advance guard.

Science News Letter, September 25, 1948

INVENTION

New Discharge System For Airplane Cargoes

➤ AN ENDLESS belt conveyor system, now ready for Air Force tests, will drop in the air from the rear of the plane 12,000 pounds of cargo in five seconds, it was revealed by Fairchild Aircraft, of Hagerstown, Md.

It is a double conveyor system, designed for the Fairchild C-82 transport plane, and is electrically operated from the pilot's position. Two conveyors extend the entire length of the ship's hold. Each of the two is in three sections, two feet wide and 9.5 feet in length. Each is individually powered. The system can be used also in Fairchild's larger and more powerful troop and cargo plane, the C-119B.

Science News Letter, September 25, 1948

PSYCHOLOGY

Find Hay Fever May Be Induced by Unhappiness

➤ HAY FEVER or asthma can sometimes be a hidden way of saying, "I don't like the way my parents treat me," or, simply, "I am unhappy."

Allergies such as asthma may represent attempts to gain sympathy or they express

hostility and mask a feeling of guilt or anxiety. Sometimes they can be cured by getting rid of hostility. This is the conclusion of Drs. Hyman Miller and Dorothy W. Baruch, both of Beverly Hills, Calif., who made a special study of 22 asthma patients. Their patients had all been previously treated for allergies without success. They all had personality problems. There were seven men, eight women and seven children in the group.

Some of the patients realized that there was some connection between their allergies and their emotions. One 18-year-old girl who suffered from hay fever said, "My whole life is stopped up like my nose."

"If you don't get my mother back, I'll cough," cried a five-year-old asthma patient when he saw her driving away in a car. "I'll get asthma. Then she'll have to come back."

His mother was too busy to pay any attention to him except when he was sick, the psychologist found out. After five months of treatment he was cured when he learned other ways of getting affection.

The patients were urged to tell their emotional difficulties to the psychologists. All of them, the psychologists found, tended to get asthmatic attacks when they were talking about something that was important to them emotionally, or something about which they felt guilty.

Under psychological treatment 21 out of the 22 patients showed improvement, the doctors reported in the JOURNAL OF CONSULTING PSYCHOLOGY (March-April).

Science News Letter, September 25, 1948

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PSYCHOLOGY

Insects See Ultraviolet

Color vision has been demonstrated to exist in the lower animals without backbones and in some insects. Among mammals, only monkeys, apes and man see color.

➤ A BULL cannot see the red color of the rag waved at him, but an insect can "see" ultraviolet that ordinarily is not detected by humans. These facts about animal color vision were among many reported to the British Association for the Advancement of Science meeting in Brighton, England, by Dr. R. J. Pumphrey.

It may be, he said, that the insects actually detect the ultraviolet light as a bluish fluorescence of the optic media of the eye rather than through color perception as we generally think of it.

Color vision, when it does occur in animals, is rather closely similar to that of man, Dr. Pumphrey reported.

It is difficult to test, however, especially in wild animals. You can be sure that an animal distinguishes color only if color vision not only exists in the animal, but if it is important to him so that he pays some attention.

Color vision has been demonstrated be-

yond scientific doubt in the lower animals without backbones and in some insects. Among vertebrates other than mammals, it has been found in some bony fishes, reptiles and birds.

The only mammals that can see color are some monkeys, apes and man.

The case for cephalopod molluscs and crustacea is "non-proven."

For the rest of the animal kingdom it is probable that color vision does exist or, as Dr. Pumphrey says, "it has no importance for the animal."

There is an interesting difference between insect color vision and that of man, Dr. Pumphrey said. Insects see color as long as they can see at all. But vertebrates cannot see color when the light grows faint. As the old saying goes, "At night, all cats are gray."

All nocturnal vertebrates are probably color blind, Dr. Pumphrey said.

Science News Letter, September 25, 1948

GENETICS

Ills Lurk in Healthy

➤ MANY apparently healthy persons are nevertheless carriers of hereditary diseases which they can transmit to their children. How to spot such unwitting menaces is one of the big problems in building up a more healthy society, Dr. James V. Neel of the University of Michigan stated in

Washington in the principal address given before the meeting of the Human Genetics Society of America.

A healthy-appearing person can be the carrier of disease-causing genes in either of two ways, the speaker pointed out. He may be destined later to develop the disease, but the malady may be of such a nature that it comes on later in life, after he has married and had children. Among hereditary diseases that develop after early maturity, Dr. Neel mentioned gout and Huntington's chorea.

In addition to being hereditary, gout is sex-linked; that is, it occurs far more often in men than in women. However, a high concentration of uremic acid in the blood, one of the less conspicuous syndromes of the disease, is often found in non-gouty relatives, both male and female, of the gouty patients. This may be used in detecting "gouty families."

Since Huntington's chorea is primarily a disease of the central nervous system, it produces a typical brain-wave pattern. This pattern manifests itself even in still-healthy young persons who are doomed to develop the defect later in life. One possible use of this test which Dr. Neel suggested is on young immigrants, to prevent the entrance of bearers of this particular hereditary disease.

The second type of healthy carrier of hereditary disease, Dr. Neel stated, is the person who will never develop the malady himself but who carries a recessive gene for it. This gene is kept suppressed by the presence of an opposite, dominant gene, but it is ready in his germ-cells to mate with a similar recessive to produce an unfortunate child, doomed to disaster from the moment of his conception.

As an example of such a defect, the speaker described a peculiar kind of anemia, which occurs only in persons of Mediterranean origin or ancestry. When it develops, it is fatal during childhood, so that its victims cannot themselves transmit it. However, their seemingly healthy brothers and sisters carry the trait and can pass it on. Its presence in such persons is hard to detect, but certain peculiarities in their blood do betray it.

The Human Genetics Society of America is a new scientific body which held its first meeting in Washington. Its president is Prof. H. J. Muller of the University of Indiana, who received a Nobel Prize award for his demonstration of the possibility of producing evolutionary changes in germ cells by bombarding them with X-rays.

Science News Letter, September 25, 1948

PSYCHOLOGY

Night Vision in Young Better Than in Old

➤ OLD PEOPLE cannot see as well on a dark night as younger men, Dr. James E. Birren, of Baltimore City Hospitals, told the American Psychological Association in Boston. Dr. Birren compared 66 men aged 43 to 80, living in the Baltimore Infirmary, with 25 Navy enlisted men aged 18 to 23.

Some of the older men had structural defects which might account for the lack of dark adaptation. But others had no such defects.

Individual differences in the loss of ability to see in the dark are, however, great. The range for the older men is more than twice as great as for the younger men.

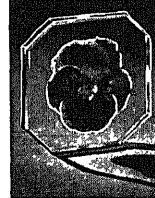
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A. S. T. M. STANDARDS ON COAL AND COKE (WITH RELATED INFORMATION)—A. S. T. M. Committee D-5—*American Society for Testing Materials*, 156 p., illus., paper, \$2.00. Sampling methods, chemical analysis, methods of testing, specifications and classifications, and definitions of terms.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING, CASE STUDIES I: CROWN ZELLERBACH AND THE PACIFIC COAST PULP AND PAPER INDUSTRY—Clark Kerr and Roger Randall—*National Planning Association*, 78 p., paper, \$1.00.

HUNTING AMERICAN LIONS—Frank C. Hibben—*Crowell*, 225 p., illus., \$3.75. The romantic story of the author's own experiences in the hunt, illustrated beautifully by Paul Bransom. The author is well known as an anthropologist.

IONOSPHERIC RADIO PROPAGATION—Staff, Central Radio Propagation Laboratory, National Bureau of Standards—*Govt. Printing Office*, 209 p., illus., paper, \$1.00. A technical book setting forth the physical and mathematical theory underlying the principles of radio communication by reflection from the ionosphere and showing the relation between the theory and practical problems of radio communication.

LET'S LOOK INSIDE YOUR HOUSE—Herman and Nina Schneider—*Scott*, 40 p., illus., \$1.50. An attractive science book for children devoted to common applications of scientific principles in the home.

LET'S TELL THE TRUTH ABOUT SEX—Howard Whitman—*Pellegrini & Cudahy*, 242 p., \$2.50. A book of information for parents to pass on to their children or for them to assimilate themselves.

THE NATION'S HEALTH: A Ten Year Program—Oscar R. Ewing—*Govt. Printing Office*, 186 p., illus., paper, \$1.00. The United States is steadily improving its health record but each year 325,000 people die whom we have the knowledge and skill to save and 4,300,000 man-years of work are lost annually through bad health.

NEW THREATS TO AMERICAN FREEDOMS—Robert E. Cushman—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. Here is a brief, clear definition of just what are the rights of Americans under our constitution and a description of some of the dangers that now threaten them.

THE PATENT SYSTEM II—Brainerd Currie, Ed.—*Law and Contemporary Problems*, 145 p., paper, \$1.00. The second of two symposiums on this subject published in the quarterly journal *Law and Contemporary Problems*.

READINGS IN THE PHYSICAL SCIENCES—Harlow Shapley, Helen Wright and Samuel Rapport—*Appleton*, 501 p., \$3.00. Here are selections from the original writings of great scientists, carefully chosen to give you an understanding of the physical world as well as a conception of the habits of thought which have built the edifice of modern science.

TAKE OFF YOUR MASK—Ludwig Eidelberg—*International Universities Press*, 230 p., \$3.25. Conversations between patients and the psychoanalysts are here set down in a most

interesting form in order to give the general reader a better idea of mental ills and the way in which psychoanalysis can aid in relieving them.

THE UNITED NATIONS: Three Years of Achievement—*Department of State*, 19 p., paper, 10 cents. October 24 marks the completion of three years since the Charter of the United Nations came into force—three years of "exploring old problems and of seeking new solutions." It is a story of steady progress against difficult odds.

YOUR INCOME TAX—J. K. Lasser—*Simon and Schuster*, 168 p., paper, \$1.00. A new edition of a guide found useful by many.

Science News Letter, September 25, 1948

AGRICULTURE

Tractors Are Increasing Danger of Soil Abuse

➤ THE change from horses to tractors on American farms has increased the danger of soil abuse.

This is the conclusion of three soil scientists of the U. S. Soil Conservation Service at Cornell University who have completed a study of the effects of organic matter and erosion on soil packing in New York State.

A soil low in organic matters when subjected to the compacting force equal to the rubber tire of a two-plow tractor, may pack to a point that water will move through the soil very slowly, Dr. John Lamb, Jr., said. On the other hand, organic matter protects the subsoil against compaction. The amount of organic matter and intensity of the packing force help determine the amount of moisture a soil can hold.

The packing force used in the soil tests was equal to a tractor or empty truck.

Among the results: For each of the soils studied, the sample with the highest degree of packing was lowest in organic matter.

"With more and more heavy equipment coming onto our farmlands today, we need to be more concerned than ever about maintaining a high organic-matter content in the soil," Dr. Lamb advised.

Science News Letter, September 25, 1948

MEDICINE

Screening Program Set Up For Cancer-Finding Tests

➤ A DRIVE is starting to put on trial the many varieties of tests for detecting cancer. Tests which pass careful screening for accuracy and simplicity will be given a mass try-out through a cooperative program.

The new program will be under the direction of the National Cancer Institute of the U. S. Public Health Service, with the cooperation of a half-a-dozen medical

schools and hospitals, Dr. J. R. Heller, director of the Institute, revealed.

Tests selected as showing promise in the laboratories will first be applied to small groups in the cooperating institutions. If they prove effective in detecting cancer in its early, curable stages, they will be used on thousands of persons with and without cancer, particularly those passing through the U. S. Public Health Service Medical Center at Hot Springs, Ark., Dr. Heller said.

"The program is still in the blueprint stage," he pointed out, "but we are at the point of crystallizing our thinking and of appointing someone to head the program and get it under way."

Three aims of this program are: sorting out the most effective detection tests; refining the most promising tests; and developing new tests for cancer.

"Even if the cause and cure (of cancer) were unexpectedly found tomorrow," Dr. Heller declared, "there would still be need for effective diagnostic tests."

Science News Letter, September 25, 1948



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Science News Letter, September 25, 1948

⚙️ **FOLDING BACK-REST** for bleacher seats at the ball game, recently patented, consists of a seat section with an upward-curved rear extension to which is hinged the back rest. When not in use, the back rest folds flat over the seat.

Science News Letter, September 25, 1948

⚙️ **REDUCING VALVE**, for use in laboratories and where gas is used industrially, gives higher delivery pressure with better control because the gas pressure is used to regulate the delivery pressure. Pressure is governed by admitting gas into a ballast chamber above a diaphragm until the desired figure is reached.

Science News Letter, September 25, 1948

⚙️ **AIR-FILLED "SWAN"** for the tiny tot, shown in the picture, is one of a line



of new inflatable toys made of vinylite plastic. Others, designed for use in bathtubs, represent alligators, fish and frogs.

Science News Letter, September 25, 1948

⚙️ **ENGINE ANALYZER**, for use in airplanes in flight, locates and identifies improperly functioning parts of the complete powerplant and provides instantaneous and continuous indications of engine troubles. Doing this during flight means that flight engineers upon landing can give accurate instructions to maintenance crews.

Science News Letter, September 25, 1948

⚙️ **VACUUM CLEANER**, for picking up the almond harvest shaken from the trees, meets a special problem in gathering the nuts and not the dust. Its nozzles have an intake two inches wide and 19 long. The width of the flanges and the exact height at which they work above the surface determine their effectiveness.

Science News Letter, September 25, 1948

⚙️ **PICNIC KIT** does double duty as a carrying case and as a table. Covered with canvas duck, its two equal box-like halves open to form a flat table which is supported by four fold-in legs like those on the familiar card table. As a case, it holds two vacuum bottles, two stainless-steel sandwich boxes and four plastic cups.

Science News Letter, September 25, 1948

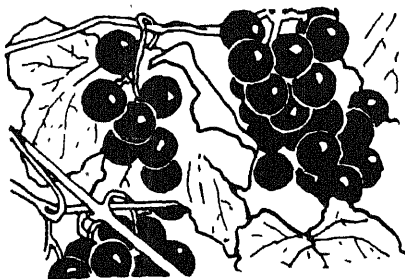
• Nature Ramblings by Frank Thone •

➤ **CROP PLANTS** native to this hemisphere form an old and familiar catalog: corn, potatoes, tobacco, beans, pumpkins, squashes and all the rest. However, all these came from the south, from the tropics and subtropics. Even the ones that the Indians of the East and Midwest were cultivating when the first white settlers came had been brought to them by nameless prehistoric forerunners of today's agricultural extension workers.

But a whole array of highly appreciated fruits and nuts occur naturally in the more heavily populated parts of the United States. Indians used them though they did not cultivate them, finding enough for their needs in the wild state. European settlers, finding them to their taste, brought them into orchards and gardens, some in Colonial times, some more recently.

Among the earliest, and certainly among the most successful, were our native grapes. Old-World grapes did not take very kindly to our Eastern conditions, though they do very well in California. But three species native to the East were made into

Success Stories



good table and juice grapes by selection and hybridization, and became the foundations of such types as Concord, Catawba and Scuppernon.

Cranberries and blueberries were long gathered for the white man's market just as the Indians gathered them, direct from the wild. In recent times, however, great areas of Eastern bog and acid-soil uplands have been devoted to the cultivation of improved varieties of these native berries.

Native species of strawberry, raspberry, gooseberry, currant and plum have been used in producing successful hybrids with European, Asiatic and South American fruits. Our American wild crabapples, however, have not been used in breeding new apple varieties, probably because they are too sour and too puckery with tannin. Three native fruits that are still largely neglected are pawpaws, persimmons and red haws.

The roster of native nuts that have made good in cultivation is shorter, but contains some notable items. Outstanding is the pecan, native to our South. More recent, but highly promising, has been the cultivation of two of its relatives, black walnut and shellbark hickory. Best-flavored of all chestnuts was our native species, now virtually extinct from the deadly attack of the blight fungus. Sole chance of survival of the American chestnut flavor lies in the use of stray flowers still found, as source of pollen for producing hybrids with the better kinds of Asiatic chestnuts.

Science News Letter, September 25, 1948



OCTOBER 2, 1948

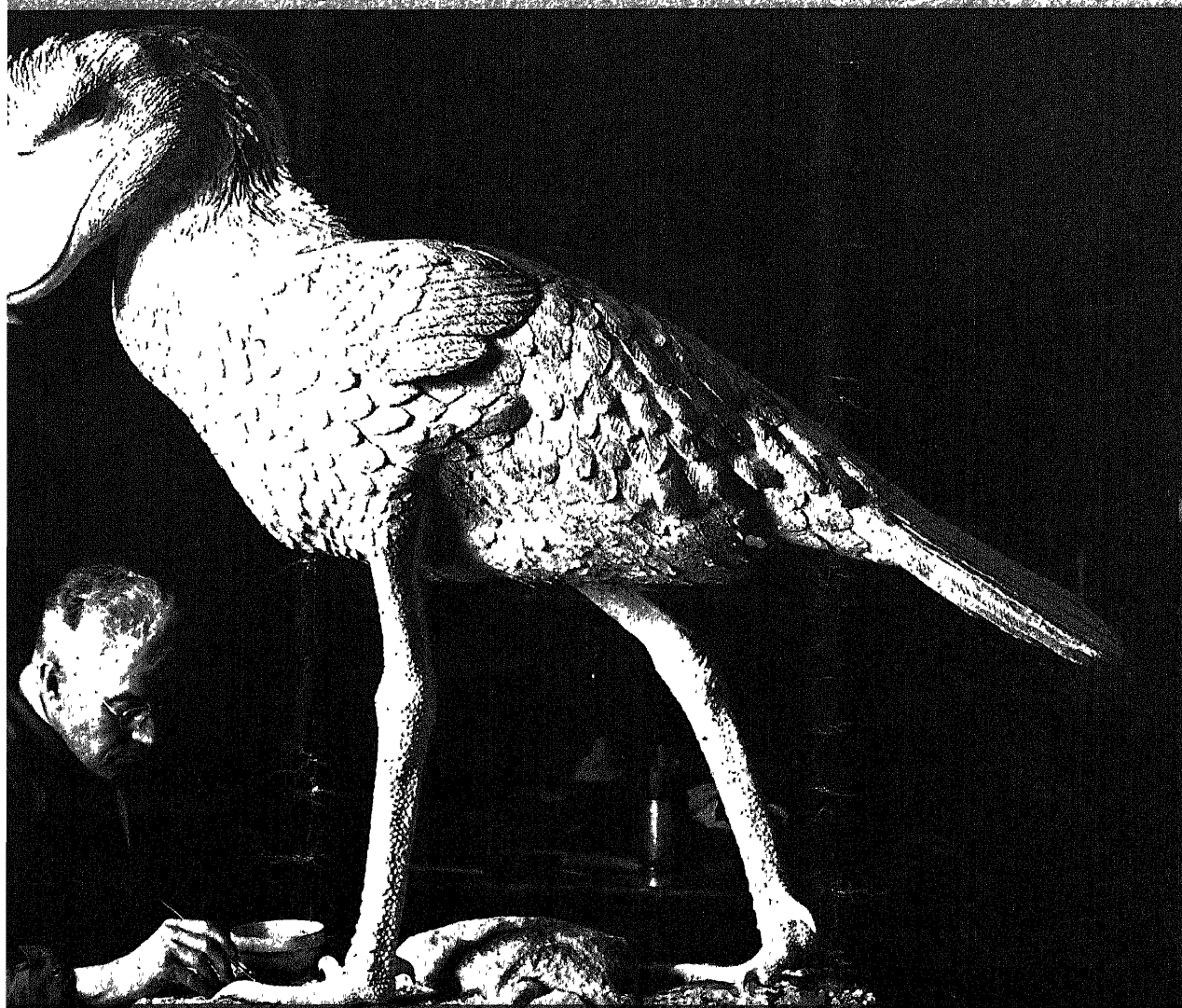
17 DEC 1948

SCIENCE NEWS LETTER



®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Terror Bird

See Page 218

A SCIENCE SERVICE PUBLICATION

Smithsonian Institution

Department of Agriculture, Agricultural Research Administration

VOL. 51 NO. 14

VETERINARY MEDICINE

Polio Clues from Pigs

Striking similarity has been found between the disease which is attacking pigs in Europe and human polio. This may aid research on virus.

➤ **NEW CLUES** for research on infantile paralysis may come from a disease which is taking a high toll of pigs in Europe.

The virus that causes porcine virus encephalomyelitis in swine may be a relative of the human polio virus. This is suggested by Dr. Martin M. Kaplan, veterinary consultant to the Food and Agriculture Organization of the United Nations, and Dr. David R. Meranze of Mt. Sinai Hospital, Philadelphia, in a report to the journal, *VETERINARY MEDICINE* (Aug.).

Striking similarity between the two diseases—in the way they strike the body and affect the community or herd—was noted by Dr. Kaplan last year in Czechoslovakia where he studied the swine scourge.

Both diseases attack the central nervous system. Slight infection develops an immunity. Transmission is probably through the digestive tract, and also through the nasal route in the pig disease. The viruses are rarely found in the blood, and the

early stages of both diseases are marked by hyper-irritability, with paralysis most commonly involving the lower limbs.

The swine virus encephalomyelitis creates inflammation of the brain and spinal cord. Thus far, the disease has not been detected in this country, but it is considered a major threat to European pork supplies. The disease spread rapidly on the European continent during World War II.

European scientists, the American report said, have noticed the parallel between the human disease and the pig infection. But no human cases of polio have been associated with the disease in swine.

Virus of one other disease, mouse polio-myelitis, may also come from the same parent strain, it was indicated.

Drs. Kaplan and Meranze urged that scientists in this country study the swine disease both because of the possibility that it might reach this country and because of the similarity to polio virus.

Science News Letter, October 2, 1948

AGRICULTURE

Vegetables Kept Fresh

➤ **FRESH VEGETABLES** that stay fresh, even after lying in the open for more than a week, are the newest prospect held forth by U. S. Department of Agriculture research on plant growth control substances. Results of preliminary experiments pointing in this direction were disclosed when the National Advisory Committee on the Research and Marketing Act visited the great experiment station at Beltsville, Md., near Washington.

It all started with some crippled bean plants, bent over into permanent humps when a growth-control chemical related to 2,4-D was applied to one of the leaves. Examination showed that the lopsided growth was due to the rapid enlargement of cells on one side of the stem. The cells stubbornly held onto the water they had quickly taken up, making the deformation permanent.

Dr. John W. Mitchell, in charge of the research, figured that if the chemical would make stem cells hang onto water, it might do the same for the green bean pods, thereby postponing their wilting.

A plot of bean plants was therefore sprayed with a dilute solution of the compound, shortly before the beans were ready to be picked. After they were picked, some

of the pods were left lying in the open, in the warm atmosphere of the greenhouse. Along with them were left an equal number of similar pods from untreated plants. After nine days the beans from the sprayed plants were still plump and fresh-looking, while those from the unsprayed control plants were as wilted and weary-looking as you would expect nine-day-old green beans to be.

The method is not ready for recommendation to truck gardeners, Dr. Mitchell stated. Further work must be carried on, to determine the best chemicals and the best concentrations to use, as well as to learn possible applications to green peppers, tomatoes, peas and other vegetables that might be benefited by a wilt-prevention treatment.

Science News Letter, October 2, 1948

BIOCHEMISTRY

Streptomycin Checks Plant-Cell Growths

➤ **STREPTOMYCIN**, killer of many germs causing human ills, prevents the kind of plant tumor known as crown gall. This is not because it is specific against the formation of gall tissue but because it has a

tendency to check any kind of plant-cell growth, in the opinion of Dr. R. S. de Ropp of the New York Botanical Garden.

Dr. de Ropp found that when he treated with streptomycin pieces of carrot inoculated with crown-gall germs within a couple of days after inoculation, the galls failed to develop. But the germ-killer also prevented the development of roots, whose growth had been started with the growth-promoting hormone, indole acetic acid.

He reached the conclusion, therefore, that "It seems more probable that streptomycin is a general inhibitor of the growth of embryonic plant tissue than a specific inhibitor of tumor tissue. Its effect on tumor formation is probably due to its action on the bacterial inciting agent."

Dr. de Ropp described his experiments in the British scientific journal, *NATURE* (Sept. 18)

Science News Letter, October 2, 1948

PSYCHOLOGY

"Planned-For" Child Is Not Always Happy

➤ A **CHILD** that is "planned-for" by its parents is not necessarily happy and secure.

Psychologists have realized that an "unwanted" child starts life under a handicap. But planned-for children have their own problems too, Dr. Sophie Schröder Sloman of the Institute for Juvenile Research in Chicago found.

One out of eight of the problem children sent to that clinic had been definitely planned for, the psychologist discovered, a total of 62 in all. And some were so unhappy that they had actually threatened suicide.

Many of these children had been deliberately brought into the world in the hope of saving the wreck of an unhappy marriage. It didn't work and when the baby could not bring peace to the parents they didn't want him any more. The old-fashioned remedy for marital difficulties, "a little one, to give a sense of responsibility and bring the parents closer together," was unsuccessful in every one of these cases. Five had ended in divorce and all of the others were still "scrapping." Four of the mothers said that the child had only made a bad situation worse.

Some of the mothers expect nothing but perfect behavior from the children for whom they have so carefully planned. This produced another group of problem children.

Children who disappointed their parents by not being of the hoped-for sex made up a third group.

There were three times as many boys as girls among the patients. Girls are more likely to take refuge in submission and neurotic behavior while boys "act out" their troubles, suggested Dr. Sloman in her report to the *AMERICAN JOURNAL OF ORTHOPSYCHIATRY* (July).

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17 DEC 1948

SCIENCE NEWS LETTER for October 2, 1948

Imperial Agricultural Research Institute
New Delhi.

MEDICINE

More Effective "Shots"

New method with radioactive chemicals may increase the effectiveness of medicines given by hypodermic injections, according to results just revealed.

➤ **BETTER RESULTS** from medicines given by hypodermic injection may be had in the future as a result of studies with radioactive chemicals.

The studies, by Drs. Myron Prinzmetal, Eliot Corday, H. C. Bergman, Lois Schwartz and Ramon J. Spritzler of the Institute for Medical Research, Cedars of Lebanon Hospital, Los Angeles, are reported in the journal, *SCIENCE* (Sept. 24).

When they gave a "shot" of radioactive sodium into the muscles, half of it was absorbed in 30 minutes and almost 90% in one hour, they found. This period of time required for the chemical to be absorbed was much longer than would be expected from impressions gained in giving hypodermic injections to patients.

In the low blood pressure that follows shock from hemorrhage, absorption of radiosodium was slowed so that only about one-tenth as much of the chemical was absorbed in half an hour as was the case when blood pressure was normal.

The passage of radioactive chemicals through the chambers of the heart itself can also now be graphically recorded with

a specially constructed ink-writing Geiger-Muller counter, the scientists announce. It is this counter which gave the information about absorption times of hypodermically injected radiosodium.

In the heart studies, the radiosodium is injected into one of the veins of the fore-

PSYCHOLOGY

Pups Get "Mental" Tests

➤ **THE MOST IMPRESSIONABLE** time of a puppy's life is when he is from four to ten weeks old—just after he gets his eyes open and before he is weaned. It is then that his later relationship to humans is determined, Dr. J. P. Scott, of the Roscoe B. Jackson Memorial Laboratory, told the meeting of the American Psychological Association in Boston.

A schedule for puppy care and development like that worked out by baby doctors for human infants is now being perfected at the Jackson Memorial Laboratory.

The puppies are given regular "mental"

arm and the radiocardiogram is made with a carefully shielded Geiger-Muller tube placed over the chest above the heart.

Since radioactive sodium has a short half-life of 14.8 hours and is rapidly eliminated by the kidneys, tiny amounts may safely be injected into the blood stream and allowed to flow through the heart. The amount of radiation with the dose given is much less than that which patients receive during various diagnostic X-ray examinations. More than 250 persons have been given injections without any bad results during the last year and a half.

"Blue baby" hearts, enlarged and failing hearts and blood circulation time have been studied with the new method.

Science News Letter, October 2, 1948

tests of their activity and development and the way they behave toward their human associates. There are daily observations, weekly physical examinations, a standard system of feeding and veterinary care. Altogether 57 puppies have been studied intensively up to the age of 16 weeks and less intensively afterwards. The puppies belonged to 14 litters from seven pure breeds.

The Jackson Memorial scientists found five stages in the life of a dog, instead of the seven that Shakespeare credits to man.

1. The newborn—lasting from birth until the eyes open. This stage is two weeks and is spent in nursing.

2. From the opening of the eyes until leaving of the nest. It is then that the teeth erupt and the pups learn to walk. Special sense organs are used. Solid food is eaten and fighting play begins. This stage lasts from the second week until the fourth.

3. Leaving the nest until weaning—from the fourth week until the tenth. Now physical skill and activity increase. They indulge in playful fighting. There are great changes in relationships with human beings. Before and after this stage neither accident nor social training seems to have as much effect on how the dog turns out.

4. Weaning until sex maturity. This lasts from the age of ten weeks until eight to ten months. There may be gang attacks on one individual in play fights. The young dog is submissive to older dogs. They go hunting.

5. Maturity.

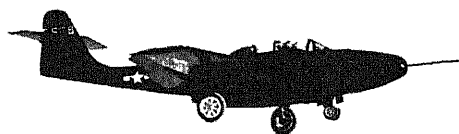
Science News Letter, October 2, 1948

MEDICINE

One Kind of TB Is Helped To Grow by Streptomycin

➤ **STREPTOMYCIN**, hailed as the best known drug for fighting tuberculosis, helps one kind of TB spread, instead of checking its growth.

Not only does one strain of the disease



ALL-WEATHER FIGHTER PLANE—This is the first flight photo of the Northrop XF-89, successor to the Black Widow F-61 night fighter. It has two jet engines, swept-up tail and wafer-thin wings and is capable of high speed. Radar-equipped, this glossy-black plane is capable of penetrating darkness, storm or fog. It is approximately 50 feet long and 15 feet high with a gross weight of over 30,000 pounds. It is manned by a pilot and radar observer.

thrive on the famed antibiotic, but it also may have a "partial dependency" on streptomycin for growth.

This startling effect is believed to have been discovered for the first time in human TB at the Veterans Administration Hospital (Lawson) at Atlanta, Ga. The case is reported in the PUBLIC HEALTH REPORTS (Sept. 3) of the U. S. Public Health Service by Drs. George A. Spendlove and Martin M. Cummings of the Public Health Service Tuberculosis Evaluation Laboratory; and Drs. William B. Fackler, Jr., and Max

Michael, Jr., of the hospital and the Emory University School of Medicine.

A patient was treated with penicillin for tuberculosis of the lungs at the VA hospital. He improved, but his saliva was still positive for TB germs. Streptomycin treatment was begun. After four months, the physicians described his course as "downhill."

They made laboratory tests with the strain of TB which the patient had. This kind of TB germs had its growth "markedly enhanced" by the antibiotic.

Science News Letter, October 2, 1948

Letters To The Editor

Molds Development

Subscribing to SNL has been an important formative force in molding the development of my son now in high school and helping him direct and find himself.

Congratulations on this multiplied, I hope, one hundred thousand times throughout the youth of our great and scientific-hungry country.—M. M. Boston, Mass.

Besides Science News Letter and the other two personal subscription services, CHEMISTRY (monthly) and THINGS of science (monthly), Science Service offers every science teacher free affiliation of her science club or group with Science Clubs of America. This brings all the material necessary for a successful hobby study of sciences in or out of the classroom. We hope readers will encourage teachers, particularly in the high schools, to take advantage of this cooperation.

Cain and Abel Version

I read your interpretation of the Cain and Abel incident (SNL, July 31). I have heard a somewhat different version and thought you might be interested in it.

Cain was the farmer. He had just broken the soil and found that agriculture on soil

that had not been tilled before was rather difficult. As a result, his crops were small; and his sacrifice was also small.

His brother, on the other hand, remained a shepherd and made a rather comfortable living from the good grazing lands. His large sacrifice was acceptable.

We can perhaps imagine Abel taunting his brother about his failure to please the Lord. Cain, who had worked harder and given more in proportion to his income than his brother, became angry and slew his brother.

Perhaps a moral for this day can well be drawn from the story. "Abel, where is thy brother, Cain?" has more meaning for us today than perhaps the traditional phraseology.—Bill Jackson, Madison, Wis.

There seem to be a number of such amplifications of the rather scanty account in Genesis. Another, from a California correspondent, is that Abel drove a flock of his sheep across Cain's field, ruining his crop—and the fight was on. Whether this actually happened long ago, somewhere just west of Eden, there is no doubt it has happened often enough elsewhere—with results as originally described in Genesis.

Well Balanced in Sciences

Science News Letter is an excellent publication and one that I would like to save. The content is well balanced with respect to various sciences and there is always something of interest to me. The Books of the Week section has become indispensable.—Robert Misch, Whiting, Ind.

Good Reference Source

Science News Letter is a timely, well prepared magazine, which any man of science, layman or amateur, would be pleased to read and keep permanently for a reference source.—Capt. Walter White, Jr., 351 Infantry Communication Officer.

SCIENCE NEWS LETTER

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Photographs: Cover, Chicago Natural History Museum; p. 211, Northrop Aircraft, Inc.; p. 213, Firestone Plastics Co.; p. 214, p. 215, Westinghouse Electric Corp.; p. 218, American Museum of Natural History.

MEDICINE

Link Hot Foods to Cancer

Drinking or eating very hot food may injure the lining of your stomach and predispose you to stomach cancer, which claims 45 percent of all cancer deaths.

➤ A VERY HOT cup of coffee or other hot food can injure the lining of your stomach. And it may play a role in the origin of one of the most deadly forms of cancer, a scientist suggested.

Dr. Andrew C. Ivy of the University of Illinois indicted very hot foods at a meeting of the National Advisory Cancer Council at the National Cancer Institute in Bethesda, Md. The Council announced a new attack on the problem of gastric or stomach cancer. A national conference to study methods of fighting this killer is being called for Dec. 13-14 in San Francisco.

Food that has a temperature of 122 degrees Fahrenheit or more can damage the tender tissues of your stomach wall, Dr. Ivy explained. But in tests he conducted, some persons drank liquids which were as hot as 131 degrees or above.

The conference planned on gastric cancer will include papers by scientists whose studies may shed some light on whether hot foods are involved in this disease.

This form of cancer claims 45% of the deaths from all types of cancer. It is estimated that 90% of the patients who get it die within 18 months after it is diagnosed, Dr. John R. Heller, director of the National Cancer Institute, said.

"We are probably a long way from a gastric cancer cure," Dr. Heller cautioned. "But even with present methods many people who now die of cancer would stand a good chance if the disease could be caught early enough," he added.

There is still no effective method for mass screening of the population to detect this form of cancer. The fluoroscope has been used, but it has been dangerous because patients and doctors were exposed to large doses of radiation from this source.

Several projects to improve this method by reducing the danger from exposure are going on in institutions such as Johns Hopkins University and Westinghouse Electric Corporation. However, this method has several disadvantages. The numbers of people who would have to be surveyed would be tremendous. There are not enough physicians in the nation for such a project.

There is one hope with this method. It is believed that chronic irritation of the stomach predisposes a person to stomach cancer. Papers to be presented at the San Francisco conference will attempt to prove or disprove the theory that people who have little or no secretion of acid in their stomachs are likely to get the disease. If

true, this might mean that patients who develop duodenal ulcers, 75% of whom are known to have over-secretion of this stomach acid, may be immune.

If this theory is true, perhaps some other method can single out the people with little or no acid secretion. Then, only these persons would have to be given mass screening tests with the fluoroscope.

At present, the disease is more prevalent in men than in women. On the other hand, it is known that men secrete more acid than women, which seems to contradict the low acid theory. A reason for the sex difference in cancer may be that men are less careful in their eating habits, the scientists suggested.

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TECHNOLOGY

Plastic Cloth Promising For Tobacco-Raising Tents

➤ GREAT TOBACCO FIELDS in the Connecticut Valley, where thousands of acres of cigar wrappers are raised each year

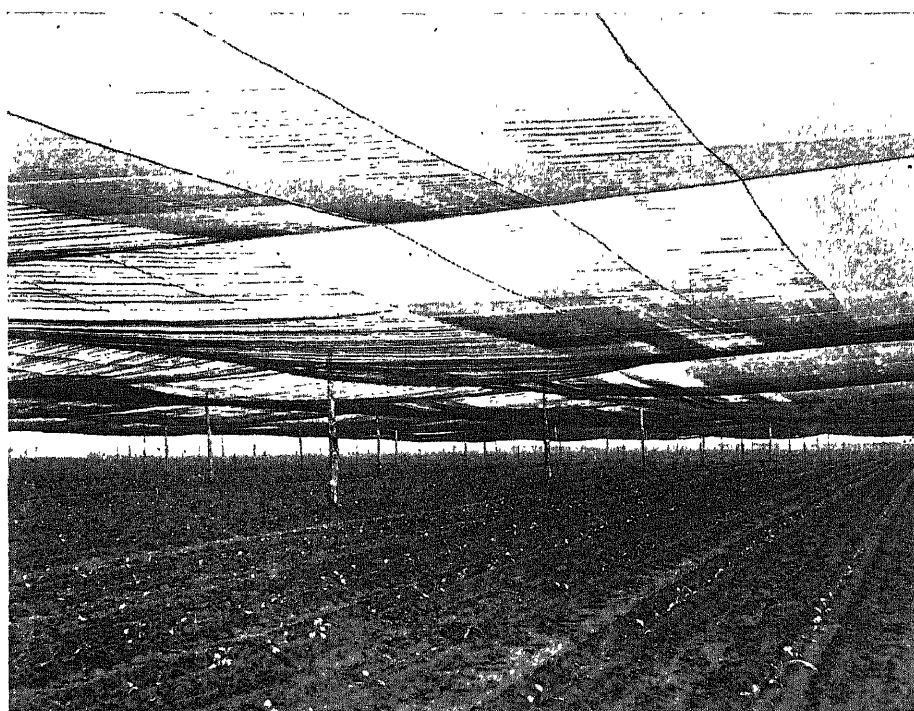
under "tents," have a promise of a new covering material. It is a plastic screening cloth, to replace the cheesecloth-like material used for the past decades.

The new material, which was tried on approximately seven acres this year, has finished its summer work successfully and is in condition for re-use probably several times. In this it differs from the cloth ordinarily used, which has little value after the end of a single season. Early tests also indicate that perhaps this plastic fabric provides a greater diffusion of light, permits a higher degree of moisture retention, and affords greater protection against frost. It is a Velon plastic and is a product of the Firestone Plastics Company, Akron, Ohio.

The Connecticut Valley tent or shade-grown tobacco is a Sumatra type of cigar wrapper tobacco that can not be grown successfully in New England in the open. The tents are flat coverings held aloft on poles and wires high enough to permit men and horses to work under them. They offer shade during the day, and hold in heat during the night. They also hold in moisture, and offer a degree of protection against storms and tobacco-destructive hail.

This Velon screening cloth may find other important applications in the agricultural and forestry fields. Among these are its use in raising shade-grown coffee and certain seedlings that need protection during their first season. Its first cost is higher than cloths now used but the fact that it can be used for several seasons will make it economical.

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PLASTICS AID AGRICULTURE—Open mesh screening cloth made of plastic is being used to protect an acreage of Sumatra-type, shade-grown tobacco at Windsor, near Hartford, Conn.

PSYCHOLOGY

Pattern for World Peace

Specialists gathered at the first International Congress on Mental Health explained how the world could avoid the disaster of another war.

By GEORGE GLENWOOD

Written from London

➤ DURING the past year in some 27 countries about 5,000 men and women, each a specialist in some phase of mental health or human relationships or both, focused their skilled attention on three questions which today are constantly on the minds of people everywhere:

"Can the catastrophe of a third world war be averted?"

"Can the peoples of the world learn to cooperate for the good of all?"

"On what basis is there hope for enduring peace?"

Recently some 2,000 of these social scientists met in London for the ten-day session of the first International Congress on Mental Health. They discussed the results of their year's work, and approved, by an almost unanimous vote, a number of recommendations prepared by their International Preparatory Committee. Before they disbanded they created a permanent World Federation for Mental Health to take up the torch of sanity and world citizenship in an attempt to light the way to world harmony and good will.

Dubbed Idealistic

In some quarters these well-meaning, forward-looking social scientists have been labeled as impractical visionaries. Peace through mental health is all very good, say some people, but who is going to get the world to listen to idealistic proposals for curing the ailments of our sick society?

Unless the proposals of the social scientists can see the light of practical application they are not worth the thought it takes to formulate them. To obtain competent opinion on the future application of mental health principles to international good will and cooperation, four of the leading luminaries at the Congress were interviewed. They were asked three pertinent questions. Their answers reflect the full range of hope and despair with which the world may face the future.

The panel of experts was made up of:

Dr. Carl Binger, consultant to the Neuropsychiatric Division of the U. S. Veterans Administration, Editor-in-chief of *PSYCHOSOMATIC MEDICINE*, associate professor of clinical psychiatry at Cornell University, and speaker to the Congress on "World Citizenship and Good Group Relations."

Dr. Margaret Mead, assistant curator of ethnology at the American Museum of Natural History, New York, one of the world's foremost anthropologists, writer of

a half dozen books on primitive societies, consultant to the UNESCO Workshop for International Understanding and to the International Congress of Americanists and Congress speaker on "Collective Guilt" and "The Individual and Society."

Dr. David Mitrany, adviser on international affairs to Lever Bros. and Unilever Ltd., for seven years assistant European editor of Carnegie Endowment's "Economic and Social History of the World War," author and lecturer on world citizenship and peace, and Congress speaker on "The Mental Health Aspect of World Citizenship."

Dr. John R. Rees, consulting psychiatrist to the British Army in World War II, Director of Medical Services at London's world famous Tavistock Clinic, President of the Congress and now first president of the World Federation for Mental Health.

The first question was: How will recommendations on mental health and good international relationships be brought home to the politician and statesman?

All four of the experts are in agreement that at present the social scientist is generally ignored by governmental agencies on the policy-making level. Yet that is just the

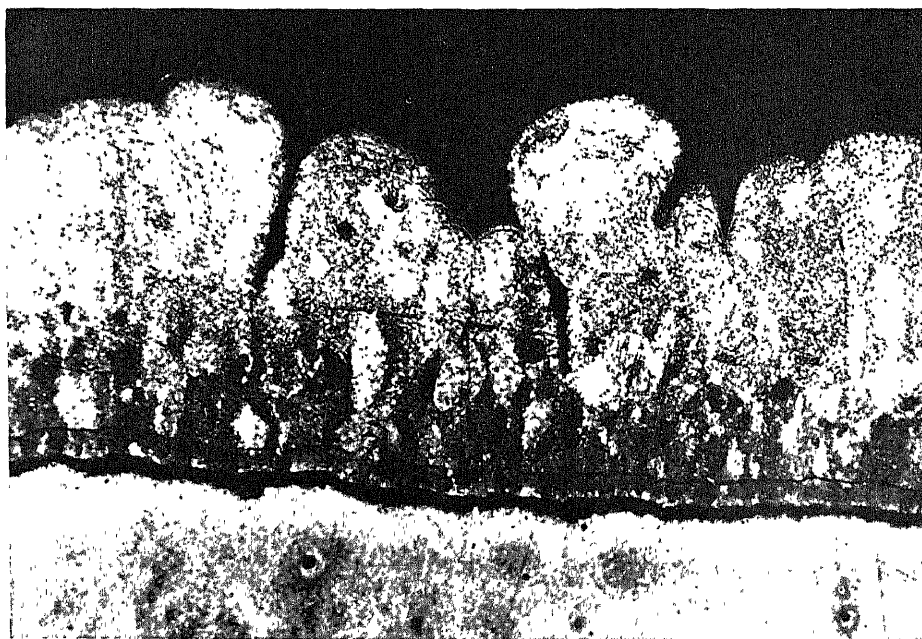
level where the social sciences can do the most to promote peace and serve mankind. Nor, thinks Dr. Rees, is there any immediate hope of getting governmental policy jobs for social scientists. He agrees with Dr. Mitrany that the social scientists must begin by winning public opinion to their side, since politicians must ultimately give ear to public opinion. Dr. Mitrany believes that social scientists can best win the attention of the public by first agreeing on and then putting forward a considered view "on the possible implications and effects of particular pieces of social legislation in regard to mental health."

World Health Organization

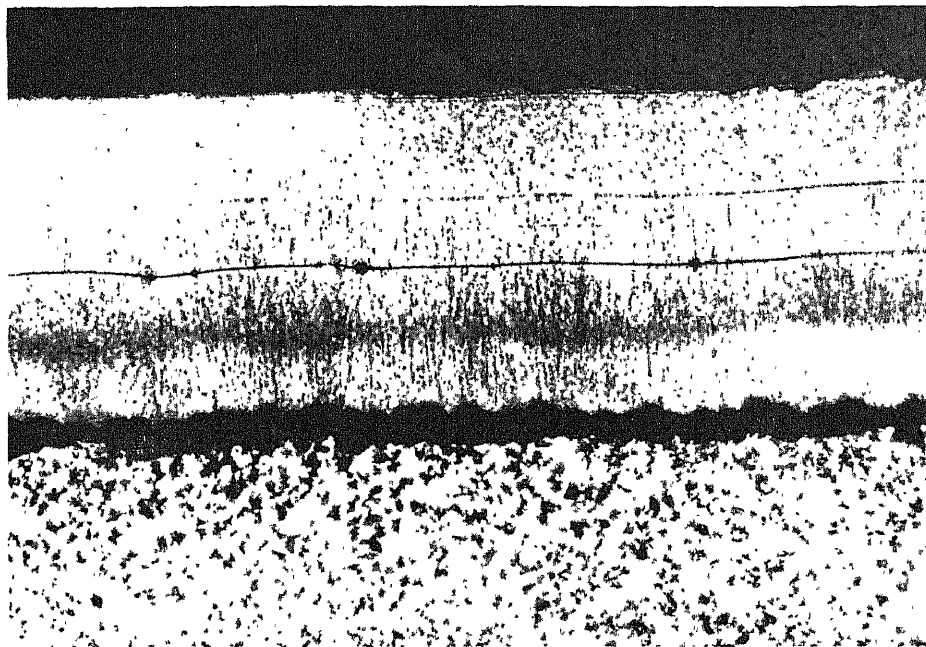
Dr. Binger and Dr. Rees are both of the opinion that one of the most promising avenues of international influence of the World Federation for Mental Health is through its association with the World Health Organization, which has 64 closely cooperating member nations, including Russia. Both Drs. Mead and Binger think that the personal influence of individual social scientists will gradually induce law makers, administrators, industrialists, etc., to give more serious consideration to principles of mental health. Dr. Mead also advocates attack at points of least resistance. "We must look for points of leverage," she says, "and use them to pry open the wall of resistance."

The second question was: Can a nation which is receptive to ideas of mental health and peace launch a national program of education for peace if its unreceptive neighbors continue to wax aggressive?

(Continued on Page 219)



OLD COPPER PLATING METHOD—This is a magnification of a cross-section of copper plated on a steel sheet by the old process. The ragged copper surface, which appears smooth to the naked eye, has to be buffed and polished before the nickel and chromium surface is plated on.



NEW COPPER PLATING METHOD—More efficient is this "periodic reverse" electroplating method which produces a smooth surface of copper. It was developed at the "luster laboratory" of the Westinghouse Electric Corporation, and practically eliminates the process of buffing and polishing.

PSYCHOLOGY

Drinking Girls Popular

Study of girls in a coeducational school indicates girls who drink are dated more than those who don't but there are more engagements among the non-drinkers.

► COLLEGE GIRLS who drink have more dates but fewer of them become engaged than non-drinkers.

A study made of 336 college girls in a coeducational institution showed this was an important difference between the two groups. The results were presented by Carol A. Hecht, Ruth J. Grine, and Sally E. Rothrock, under the direction of Dr. Jessie Bernard at the State College of Pennsylvania, in a report made to the QUARTERLY JOURNAL OF STUDIES ON ALCOHOL (Sept.).

They divided the women into five categories according to the frequency of drinking during the two-week period studied: women who never drank; infrequent drinkers, who had had nothing to drink within the last two weeks of the study; occasional drinkers who had drunk once in this period; near-regular drinkers who had had two drinks within this period; and regular drinkers.

This revealed that there were twice as many regular drinkers, a total of 90, as there were non-drinkers.

Other facts brought out by the study were:

The infrequent drinkers had begun to

drink in their 19th year while the regular drinkers started earlier, the average age being 17.

The girls who did little or no drinking attended church more often but the study was not conclusive on this point, the investigators stated.

Most of the young women who drank did so with the knowledge of their families.

Drinking and smoking among women have had similar trends, the investigators pointed out. They suggested that both were strongly supported by extensive advertising campaigns and upheld by motion picture models of behavior.

All these facts show a widespread change in middle-class standards, they said. The traditional tea party has given way to the cocktail party. This study, although limited, "represents a socially important group, namely college women," they said, adding "they come for the most part from middle-class homes and thus reflect middle-class standards."

They feel that this study of young women is significant because "their behavior probably indicates a trend of the immediate future."

Science News Letter, October 2, 1948

ENGINEERING

Better Coatings Studied In New "Luster Laboratory"

► BETTER, more lasting finishes for household appliances and other electrical products may come from a new "luster laboratory," now in operation at the Westinghouse Electric Corporation's East Pittsburgh Works.

Scientists in the new laboratory are working on problems of improving the finishes used to coat steel with gold, silver, nickel, copper and chromium. The last three are used on home appliances, while gold and silver have important applications in other electrical equipment.

Apparatus in the laboratory includes:

A surface analyzer which magnifies 40,000 times.

Gage to check the thickness of coatings which are as thin as one-fiftieth the width of a human hair.

Weighing device for objects half the weight of a common postage stamp.

Equipment to reproduce in the laboratory different types of climatic conditions to which finishes on electrical products might be exposed.

First achievement of the new study is a "periodic reverse" electroplating process which reduces the expensive job of buffing and polishing after the final coating, George Jernstedt, manager of Westinghouse electroplating operations, reported.

Science News Letter, October 2, 1948

INVENTION

Light Produced by Shaking In Newly Patented Lamp

► A FLUORESCENT LAMP that takes no electric current, but lights up when it is shaken, is the novelty on which U. S. patent 2,449,880 has been issued to James L. Cox of Ramsey, N. J. It is not intended to produce continuous illumination, but is considered better adapted to such purposes as signalling, use as an automobile tail-light, and special stage effects.

The lamp consists of a hollow glass vessel with the air exhausted and a low-pressure atmosphere of argon, neon or other inert gas sealed in. It contains also a small quantity of mercury and one of the luminescent pigments known as phosphors, such as are used now in the familiar fluorescent lamps.

This phosphor may either be mixed as a loose powder with the mercury, or spread on the inner wall of the lamp. In either case, it bursts into a glow when the mercury is agitated, and keeps on shining as long as the agitation continues.

Just what makes the light is not understood at present, the inventor admits. It is conjectured to be some kind of friction-electrical effect between the mercury and the phosphor.

Science News Letter, October 2, 1948

BACTERIOLOGY

Expect To See Viruses at Work with New Microscope

► THE POSSIBILITY of seeing disease-causing virus at work in living cells is suggested by experiments with the new kind of microscope that uses contrast of phases in the light.

Dr. Robert Barer of Oxford University's department of human anatomy reported in the British scientific journal, *NATURE* (Aug. 14), that he has photographed the virus of parrot fever and smallpox vaccine. The viruses were unstained and mounted in water. These are among the larger viruses, but he has also observed living *Leptospira*, tiny organisms which cause some types of jaundice and the swamp fever of eastern Europe. *Leptospira* are said to be less than 0.15 microns or six millionths of an inch across.

The phase contrast microscope depends on contrast of dark and light to make small particles visible. First described about a decade ago by the Dutch scientist, Dr. T. Zernike, the phase-difference microscope has proved a boon to scientists who can now study living objects under high magnification. It brings out details without using stains which kill the cells.

Dr. Barer believes that still smaller viruses can be seen with the phase-difference microscope if an intense light source and a strong absorbing phase plate are used.

Science News Letter, October 2, 1948

DENTISTRY

You May Exert Force of 260 Pounds on a Molar

► HOW WELL you chew your food can now be measured in pounds. Tests made on a group of people with normal teeth show that the force exerted can range from 14 to 260 pounds on a single molar. Dr. R. S. Manly, of Boston, Mass., reported to the American Dental Association, meeting in Chicago.

He suggested that the low chewing force exerted by some people is caused by pain or fear of pain rather than lack of muscle power. In support of this theory, persons with low chewing force had their dental tissues anesthetized. Fearing no pain, they showed a marked increase in chewing power, he said.

Science News Letter, October 2, 1948

DENTISTRY

Electron Microscope Finds "Cracks" on Teeth Surfaces

► THE PROBLEM of decaying teeth may be licked soon with the aid of the electron microscope.

As a research tool it is opening up new avenues of research into the causes of

of mankind's most widespread diseases, the American Dental Association was told in its meeting in Chicago.

This sensitive instrument has already revealed "cracks" on the surfaces of teeth which were not known to exist there before. Drs. David B. Scott and Ralph W. C. Wyckoff, of the laboratory of physical biology of the National Institutes of Health in Bethesda, Md., reported.

These cracks, moreover, have been eliminated as suspects in the beginning of the decay process because they were found present on both decayed and non-decayed surfaces of the teeth, the scientists reported.

These cracks will be the subject of further study on young teeth, both because they are more apparent on them than on old teeth and because caries is primarily a disease associated with the teeth of young people.

Science News Letter, October 2, 1948

DENTISTRY

Toothless Gums Still Need To Be X-Rayed

► PERSONS who have lost all of their teeth still need to safeguard themselves against infection by having X-ray examinations, the American Dental Association was told in Chicago.

Studies have revealed that one out of every four patients with extracted teeth still has roots, unerupted teeth, cysts or other possible sources of infection present, according to Drs. LeRoy M. Ennis and Harrison M. Berry, Jr., of the University of Pennsylvania.

One survey made among 500 patients with no teeth or with a few teeth showed that 130 of them were wearing dentures with a possible source of infection underneath. Moreover, they had been doing so for about four and a half years, the dentists said.

Science News Letter, October 2, 1948

AERONAUTICS

New Turning Rule by CAA To Cut Plane Noise

► GOOD NEWS for people living in the vicinity of major airports is a new ruling by the Civil Aeronautics Administration.

Shallow turns at altitudes lower than 500 feet are now permitted by the CAA. This will let pilots avoid some of the densely-populated areas near runways in taking off. It may result in less noise from low-flying planes in many localities.

Traffic patterns at three major airports—Newark, N. J., La Guardia Field, N. Y., and the Washington National Airport—have already been adjusted to keep the heavy, and loud, planes as far away as possible from congested areas, the CAA announced. Officials pointed out, however, that the CAA will not order airline pilots to make the low-altitude turns.

Science News Letter, October 2, 1948



VETERINARY MEDICINE

Over-Use of Sulfa Drugs On Hens Cuts Egg Yield

► SULFA DRUGS given to chickens to fight diseases may cost the flock owner half his birds' egg production, the American Veterinary Medical Association warned.

In one experiment, when 671 chickens were given sulfa drugs for periods of from three to six days, laying rate fell off 50% in one week, as compared with that of an untreated control group of 430 birds. Egg production in the treated group did not get back to normal for a month.

This is not intended as an argument against the use of sulfa drugs when needed, the Association emphasizes. However, it is felt that poultrymen should not be too ready to reach for the sulfa bottle.

Science News Letter, October 2, 1948

METEOROLOGY

Death Valley Proved To Be Hottest Spot on Continent

► DEATH VALLEY in California is the hottest spot in North America.

From the temperature records of several decades, an Army meteorologist has come up with the following Death Valley heat records:

A top temperature of 180 degrees Fahrenheit may be expected on the desert floor in the valley one day in every seven years.

At five feet above the ground, where the official figures are taken, it was 134 above on July 10, 1913.

Top daily temperature was not under 127 degrees F. from July 7 to 14, 1913.

Coldest temperatures recorded at two different stations in Death Valley during the month of July were 69.11 above at one in 1936 and 68.26 at the other in 1938.

Arnold Court of the Office of the Quartermaster General, in a report to the American Meteorological Society, says that weather observations are getting more accurate all the time. But, he adds, no place else in North America is likely to break Death Valley's heat records.

The Death Valley studies showed that the surface sand or gravel has the highest temperature, with the temperature dropping as altitude is increased. Thus, when it is 160 degrees above zero Fahrenheit on the surface, it is 116 degrees five feet above the ground. And at 2,000 feet, it would be a mild—for Death Valley—92.

Mr. Court's studies are part of an Army research program aimed at development of clothing to protect soldiers in any climate.

Science News Letter, October 2, 1948



ENGINEERING

Acids Not Friction Cause Auto Engine Wear

► THE ACTION OF ACIDS resulting from low-temperature operation is the major cause of automobile engine wear, Shell Oil Company research scientists declared.

When your car is used for short trips around town, with much starting and stopping, it is running "cold." Partially burned fuel gases and moisture result from this and attack the engine. It adds up to 90% of the wear on your car's engine, C. E. Davis, vice president in charge of manufacturing of the oil company, reported.

Laboratory studies and 2,500,000 miles of road testing were made by the scientists who discovered that acids rather than friction are the main enemies of long life for the motor in your car.

Science News Letter, October 2, 1948

BOTANY

Males Win Four to One On Form—in Poplars

► ON FORM, males are four-to-one winners over females—among cultivated poplar trees. This appears in studies made at the Harvard Forest in Petersham, Mass., by Scott S. Pauley, and reported in the journal, SCIENCE (Sept. 17).

Poplars belong to that minority of tree genera in which male and female flowers are borne on separate trees, instead of both on the same tree. An examination of 76 distinct strains of poplar grown in this country, all of which were originally selected for good stem form and general vigor and all kept true to type by propagating only by cuttings, showed that male lines or clones prevailed over female by a little more than four to one. Of eight poplar lines similarly propagated in Europe, only two (exactly one-fourth) are females.

Science News Letter, October 2, 1948

ICHTHYOLOGY

Mackerel's Family Life Traced by Biologist

► MACKEREL have long kept their home life a deep secret, but finally an English scientist has found out about it. He is Dr. G. A. Steven, of the Plymouth Laboratories of the Marine Biological Association.

These fish, that figure so importantly in England's bill of fare, leave their inshore haunts in early spring and go out into deep water, at least a hundred miles west of the

nearest land. There they deposit their eggs at a depth of some 600 feet.

After spawning, the fish return shorewards and disperse all along the coastline, where they remain until late autumn. Then they disappear from the surface, and concentrate in widely separated spots on the sea floor. In early spring they come to the surface again, and prepare to repeat the cycle.

Science News Letter, October 2, 1948

CHEMISTRY

Quick-Setting Plastic Is Mineral-Filled

► A NEW MINERAL-FILLED plastic which is molded in a matter of seconds was announced by the Plaskon division of Libbey-Owens-Ford Glass Company in Toledo, Ohio.

Called alkyd molding compound, the new plastic is being used on electrical conductors, switch units and similar parts which are now in limited commercial production. First public exhibit of the new material was made recently at the National Plastics Exhibition in New York.

Plaskon alkyd is produced in granular form with natural light brown color, but a range of colors for the plastic is expected to be made available.

Science News Letter, October 2, 1948

ENTOMOLOGY

Leaf-Hoppers Are Carriers Of Elm-Tree Disease

► PHLOEM NECROSIS, an elm-tree disease even more deadly than the more widely publicized Dutch elm disease, can be carried from sick to healthy trees by leaf hoppers, small insects so inconspicuous that most people never notice them. This has been proved in experiments running back as far as 1940, now reported by W. L. Baker of the U. S. Department of Agriculture, who did his work at the Bureau of Entomology and Plant Quarantine laboratories in Columbus, Ohio.

Leaf-hoppers of two different genera were permitted to feed first on elm seedlings known to be diseased, then on healthy seedlings, all kept carefully in insect-proof cages. Necrosis was very slow in developing on elms infected by the bites of one of the two insect genera, taking as much as five years to appear. Development time was somewhat shorter in the case of the other insect's attack.

Further work is still in progress; but now that some definite knowledge of the disease carriers has been gained there is some hope of eventually developing counter-measures against this destructive shade-tree disease, known to exist from West Virginia to Kansas and from Iowa to Mississippi, Mr. Baker pointed out in the journal, SCIENCE (Sept. 17).

Science News Letter, October 2, 1948

MEDICINE

New Plastic Film Dressing Will Keep Wounds Dry

► YOU WILL NOT have to worry about getting your wound infected or your bandage dirty on the job if you wear a new plastic film dressing.

The new dressing is made of a nylon-derivative film. It is bacteria-proof, but at the same time it keeps the wound dry in spite of body perspiration. Experiments with the new dressing are reported in the British journal, THE LANCET (Aug. 7), by J. P. Bull, J. R. Squire and Elizabeth Toppley, all of the Birmingham Accident Hospital.

They explained that the improved dressing is based on a wartime discovery. In the search for suitable clothing for tropical warfare, it was found that a material can protect against liquid from the outside, while allowing perspiration to pass through it in vapor form.

Advantages of the dressing are: the skin is kept dry; the wound can be inspected without lifting the nylon dressing, because the doctor can see through it; and there are fewer of the germs usually found on normal skin under this dressing.

To make the dressing waterproof, the scientists built a "window frame" of another plastic. One of these "window frames" coated with adhesive goes around the edge of the dressing, while the other frame sticks to the skin. The dressing will remain in place for days if the skin is free of grease and a heavy growth of hair. Workers using oil require additional protection, in the form of acrylic resin which is painted over the edges of the adhesive.

Clinical trial of the dressing for industrial and other wounds is now in progress, the scientists stated.

Science News Letter, October 2, 1948

GENERAL SCIENCE

Scientists in Reserve Get Research Projects

► SCIENTISTS who have uniforms in their clothes closets, ready for active service in an emergency, are now being given research and development projects during peacetime.

A new plan of the Research and Development Group of the Army's General Staff is funneling to officer reservists throughout the nation some projects and research jobs that the Army needs done under present conditions.

Local groups are being organized in the large cities and universities to plan and conduct the research projects and other reserve corps activities.

Reserve officers who are scientists are being encouraged to submit ideas and problems that they believe, from their wartime experience, will help the Army's defense program.

Science News Letter, October 2, 1948

PALEONTOLOGY

Giant Birds Restored

Ancient extinct species of birds that couldn't fly but pursued their prey on foot, such as the monster called the Terror Bird, have been restored.

By DR. FRANK THONE

See Front Cover

► **BIG BIRDS** are having their day in American museums just now. Birds ten feet tall. Birds with leg-bones that rival those of an elephant. Birds that could have chopped off your head with one snap of an enormous, trap-like beak. The biggest and most awesome birds that ever lived.

Fortunately for human peace of mind, they are all extinct. Especially that last number, the nightmare carnivorous monster shown on the cover of this week's *SCIENCE NEWS LETTER* that once lived in South America, and has been aptly nicknamed the Terror Bird. He is the deadest of the lot, having been extinct something like 11,000,000 years.

More formally, the Terror Bird is known to zoologists as *Mesembriornis*. Its massive bones, first found in Argentina nearly 60 years ago, show that it stood nearly as tall as a modern ostrich but was more heavily built. Its great beak, with a tearing hook

at the end, indicates plainly that it lived mainly on a diet of flesh.

Like all giant birds, both living and extinct, it could not fly, but pursued its prey on foot. Its habits probably resembled those of that modern American terror-to-snakes, the California road-runner, except that everything was scaled up to size: it could easily have done in a small alligator as its modern smaller counterpart devours a lizard.

The Chicago Natural History Museum has placed on display a lifelike restoration of this ancient monster-bird, assembled around wooden replicas of its bones and beak. Leon L. Pray, staff taxidermist, found that carefully saved pencil-sharpener shavings, mixed with casein paint, ground asbestos and chopped tow, made an excellent modelling mixture. Feathers were whittled out of balsa wood, and feet and claws from tulip-tree wood. Mr. Pray followed the coloration of the Terror-Bird's small-sized collateral descendant, the carima of Argentina and Brazil, in painting his restoration. As you look at it, you are glad that it isn't as alive as it looks—it might decide to snap at you.

Ten-foot-tall moa skeletons, approximately twice the height of the South American bird though nowhere nearly as formidable, were brought back by an expedition from New Zealand just in time to feature the formal opening of the new Sanford Hall of Biology of Birds at the American Museum of Natural History in New York. Moas have not been extinct very long: indeed, there is fair reason to believe that the last specimens were seen by the early Polynesian inhabitants of New Zealand, and perhaps even hunted by them.

The moa was not a bird to be particularly dreaded—unless he happened to kick or step on you. He was fairly closely related to the modern ostrich, and like the ostrich was not a flesh-eater, being content with a vegetarian diet varied with chunks of rock and assorted junk.

Five moa eggs have been found. Their original weight is estimated at nearly nine pounds. An egg like that would have fitted into Chesterton's description of Noah: "He ate his eggs with a ladle, from an egg-cup big as a pail."

At that, however, the moa's egg was only about half the weight of the egg of the great Elephant Bird of Madagascar, which was the biggest bird that ever lived. It has been extinct longer than the moa, but recently enough so that some of its eggshells and a few of its huge bones were

known even to the Arab voyagers of the Middle Ages. It was the original of the fabled Roc of the Arabian Nights tales, the bird that could fly off with an elephant clutched in each claw and a third in its beak.

Of course, the Elephant Bird couldn't fly; it was another giant ostrich, a third taller than present-day ostriches. Its thigh-bone was half a yard long, and its drumstick bone measured nearly 28 inches. Both were massive in accordance with the body-load they had to carry, so that it is no wonder that this gigantic fowl has been dubbed the Elephant Bird.

Since it will never be possible to invite any of these extinct bipeds to step on a platform scale, any figures for their once-living weight must be estimates. However, one American Museum ornithologist, Dean Amadon, has done a most ingenious job of estimating the weights of the two huge relatives of the ostrich.

Carefully measuring all important bones of the extinct birds, he has compared them with the corresponding bones of the modern ostrich, as well as with those of the ostrich-like birds of South America and the Australasian region. Comparing measurements of living birds with their known weight and filling in the "unknown" frame in the ratio, he arrives at a weight of nearly half a ton (965 pounds) for the Elephant Bird, and slightly over a quarter of a ton (520 pounds) for the ten-foot moa.

Science News Letter, October 2, 1948



NEW ZEALAND MOA—This ten-foot bird, closely related to the modern ostrich, was believed to have been last seen by early Polynesian inhabitants of New Zealand.



ELEPHANT BIRD—These are the bones of the biggest bird that ever lived. It was a giant ostrich, a third taller than present-day ostriches.

World Peace

(Continued from Page 214)

Dr. Mead and Dr. Rees immediately took exception to the wording of this question. Neither one of them would accept the idea of receptive and unreceptive nations. They believe that all nations are receptive in some respects, unreceptive in others. Dr. Rees insists that even though the world is made up of nations of different ideologies, no nation incurs any risks in educating its peoples for peace since such education does not imply pacifism or laying down before aggression.

Education for peace, Dr. Mitrany agrees whole-heartedly, is not weakening but, in fact, strengthening to a nation. A people's appreciation of peace makes them resist only more strongly the aggressiveness of outsiders. The common practice of preparing for "so-called" defense by arousing fear in one's own people is psychologically neither a sound nor reliable mental foundation for the purpose of defensive war. By inculcating aspiration to world citizenship a government would make its people more conscious and, therefore, more resentful of the denial of that idea by other nations. Dr. Binger, on the other hand, questions the ability of a peace-inclined nation to concentrate on promoting peace when menaced by aggressive neighbors, since fear and anxiety frequently precipitate people into war.

The last question threw the bogies of war and revolt squarely in the laps of the experts: How are we going to get unreceptive nations to accept the ideals of peace through mental health and world community; must their peoples rise and overthrow them, or must we have yet one more war to force such nations into receptiveness?

War No Solution

Here again there was opposition from Dr. Mead and Dr. Rees on the use of the terms receptive and unreceptive. But with one accord all four experts agreed that neither revolt nor war was any solution to the world's ills.

"Revolution or war is no way to get mental health," says Dr. Mead.

Dr. Mitrany points out that "One can not bludgeon people into accepting ideas." He goes on to say that our failure to achieve lasting peace so far is due not a little to the negative view of peace we have held—a mere absence of violence. When peoples begin to think of peace as something positive and continuous—an active campaign for the mutual good and benefit of all the people of the world—only then will peace become real and stable.

Though disclaiming any leanings towards pacifism, the experts expressed the view that "unreceptive" states could best be won over by example, cooperation and by winning their confidence. Dr. Mitrany's suggestion for gaining their confidence is by

developing positive joint international activities and services. Dr. Binger thinks that confidence can best be won through intellectual exchange on a level which does not involve political bias. He points out that several of our leading scientists have the confidence of their Russian counterparts. (But the atmosphere of vituperation and recrimination enveloping the recent World Congress of Intellectuals meeting in Wroclaw, Poland, does not seem to support Dr. Binger on this point.)

Dr. Rees believes we must undertake an international program of gradual, persistent education through all available means. Dr. Mead again stresses her belief that every society has its receptive points and that these are the ones to be attacked with all the socio-scientific vigor at our command.

But if, in spite of everything, war should come, then our civilization as we know it today is probably doomed. Another war, says Dr. Binger, will bring all the horrors of complete regimentation, all loss of individual freedom, excessive industrialization and, if not atom bombing, then something even more terrible—bombardment with germs causing every conceivable disease in man, his livestock and his crops.

That, then, is the situation as seen by four of the world's leading social scientists. Certainly it is not a rosy picture—these authorities are far too close to reality to be Pollyannas—but neither is it one of hopeless gloom.

Science News Letter, October 2, 1948

METEOROLOGY

Radar Navigation in Dust Storms Successful

➤ SAND AND DUST STORMS that plague shipping in the Persian Gulf hold no terrors for a radar equipped vessel, in the opinion of Master V. P. Marshall of the American S. S. Cornell. Vessel navigation in a dust storm is a new application of radar.

In the Red Sea, Arabian Sea and Persian Gulf sand and dust storms are frequent and visibility often cut to one mile, or less, for prolonged periods, he stated in a letter to Sperry Gyroscope Company, of Great Neck, L. I., who are makers of marine radar equipment. With our radar, he stated, no time has been lost by the vessel arriving at, or departing from, dust-shrouded ports.

Sperry's marine radar was developed primarily for use in sailing in foggy weather. It locates shorelines, islands and other vessels. Many installations of radar equipment made by various companies are in use on coastal vessels, ships on the Great Lakes, river boats and ocean liners. The equipment used is similar to the wartime radar on planes that helped locate enemy installations and the type used on shore to locate invisible enemy planes in the air.

Science News Letter, October 2, 1948

*"Body and Mind are
One and Inseparable."*

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by Edward A. Strecker, M.D.

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Do You Know?

Heavy fires sometimes injure *shade trees* seriously by "cooking" growing tissues.

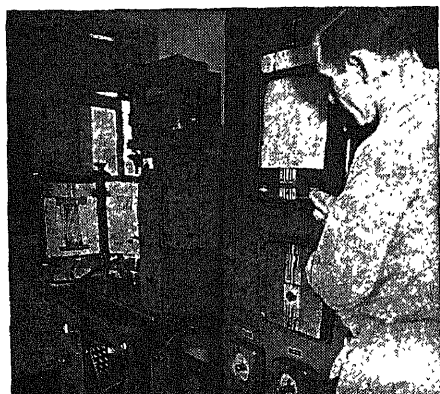
The American *sweetgum*, in the fall, may have colors from yellow through gorgeous red and crimson to dark purple.

Overall production of *building materials* during the first half of the present year exceeded the record-breaking production of last year.

American cheese, nonfat dry milk, peanut butter, canned tomatoes, tomato juice and concentrated orange juice are a few of the *foods* distributed under the National School Lunch act of Congress.

Foresters are selecting seed for growing *trees* with the same care that farmers select seed for their crops; there are strains of trees that produce better wood than do other strains of the same kind of tree.

Pinkish tan-colored fresh and frozen *shrimp*, now on the market, are not spoiled common shrimp but are a species known as grooved or brown or Brazilian shrimp, which is now being taken in unusual quantities from the Gulf of Mexico.



MICROMAX CONTROL Adds a Helper To The Research Team

In a research or control lab, such as is shown above, the man-hours required for temperature regulation of a furnace can be all but eliminated by the same kind of Micromax Program Control which industry uses on its giant furnaces.

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AERONAUTICS

Radio Navigation System

➤ AIRCRAFT TODAY, with the newly designed Bendix radio navigation system, can tell exact position automatically while in flight, it was revealed in Cleveland at the National Air Races which include the Bendix long-distance event with a take-off from Long Beach, Calif.

A "fix" can be read by the pilot on a meter at any time and any place during flight as easily as the automobile speedometer is read, according to Howard K. Morgan of the Bendix Radio Division. Also new electronic devices used in Ground Controlled Approach apparatus aid landing with precision and safety, regardless of weather.

For higher speed aircraft, both in landing and in flight, the accent is on better and more reliable radio instrumentation and communication. Very high frequency (VHF) waves are replacing the low and medium frequencies long used. The advantage is static-free communication, which means that a pilot can understand communications from the ground while in storm areas, the time when he needs to hear best. Airports operated by the U. S.

Civil Aeronautics Administration are being rapidly equipped with VHF apparatus. So also are the radio ranges which guide pilots along the air routes.

The new VHF Omni-Directional Ranges already installed by the CAA throughout the country provide facilities never before available in radio ranges. The design of the Bendix NA-3 Navigational System makes these available to the pilot with great convenience and reliability. The frequency range used eliminates not only the atmospheric static but also what is known as precipitation static caused by rain, snow or dust.

More communication channels are available in the Very High Frequency band than in the lower frequency band. There is less interference between channels since the transmissions do not extend beyond "line of sight" distances. The Omni-Directional Range is not limited to two or four courses, but will supply accurate information on any course to the station the pilot may select. This accounts for its name, Omni-Directional.

Science News Letter, October 2, 1948

CHEMISTRY

Oil Recovery Progressing

➤ BITUMINOUS SANDS of Alberta, a great untapped source of fuel oil and gasoline, are gradually yielding to research scientists trying to find an economical process for the extraction of their petroleum. The research is being undertaken both by the Canadian government and the Research Council of Alberta, located at the provincial university, Edmonton, Canada.

The so-called Athabasca tar sands are in a 10,000-square-mile area north of Edmonton. Estimates vary on their petroleum content but it has been placed as high as 250,000,000,000 barrels. There is no question regarding the possibilities of extracting oil from them; the problem is to find a way at a low enough cost.

A government-sponsored separation plant is being erected at Bitumount on the Athabasca river. It contains a hot water separation unit designed on the results of researches of the Alberta Council. The recovery of oil by the hot water separation process is from 80% to 90% from good grades of sand. Water-flooding of the sands in place is a promising method of oil recovery.

Work has continued during the past year on applicability of water-flooding to the bituminous sands, an annual report of the council, just issued, states. Measurements of the viscosity of the bituminous sand oil and of the viscosity-temperature relationship show that the viscosity de-

creases very rapidly as the temperature rises above 32 degrees Fahrenheit to about 100 degrees. It decreases slowly above 150 degrees.

It can be said with considerable definiteness, the council asserts, that the viscosity of the bituminous sand oil at formation temperature is too great for water-flooding, and that a successful application of this method of oil recovery will involve the heating of the sand beds, in place, to temperatures above 100 degrees.

Water under practicable pressures will flow through bituminous sand at 36 degrees Fahrenheit, and will displace oil. The flow of oil is small, however. At 150 degrees, on the other hand, the flow is usefully great and half the oil is displaced before the ratio of water to oil in the flow becomes unduly high.

Science News Letter, October 2, 1948

RADIO-ASTRONOMY

Meteors Enable Us To Hear Distant Programs at Night

➤ MILLIONS of tiny meteors entering the earth's atmosphere may be responsible for our ability to receive radio broadcasts from long distances during the night, states Dr. A. G. McNish of the National Bureau of Standards.

Radio waves, which travel in straight

lines, must be reflected back to the earth if they are to be heard at any great distance. Tiny electrified particles in the ionosphere bounce the short waves back to earth.

The ions that compose this reflecting layer are produced mainly by the action of the ultraviolet in sunlight which splits electrons off the atoms and molecules high up in the rarefied air. Some of the electrical particles may also be produced by impact of tiny corpuscles shot off from the sun, some by cosmic rays and some by meteors.

The lower portion of the ionosphere is rich with free electrons during the day due to the action of sunlight, Dr. McNish pointed out at a General Electric Science Forum. Directly after sunset most of the electrons are gone because they become recombined with molecules.

"Yet—and herein lies the mystery—a

sufficient number of electrons persist at this lower height all through the night to reflect radio waves," Dr. McNish said.

"Judging from the rate of electron-decay just after sunset, one would not expect to find any significant number beyond midnight."

Meteors may be the agency responsible for reflecting the radio waves at night. Astronomers estimate that more than a thousand billion of these particles, smaller than grains of sand, enter the earth's atmosphere during a 24-hour period. Travelling at speeds up to 200,000 miles per hour, they would smash violently into atoms and molecules of the upper air. These meteors would tear some of the electrons from these particles to which they belong and thus maintain the radio roof throughout the night.

Science News Letter, October 2, 1948

ENGINEERING

More Mileage Per Gallon

► TOMORROW'S AUTO engine is going to give 25% more miles per gallon and you will be filling up at the gasoline pump on such high-compression fuels as triptane, toluene, benzene and trimethylpentane as well as superleaded "gas."

The American Chemical Society was told in St. Louis by leading petroleum chemists that new fuels for more efficient engines can be ready by the time the automotive engineers can build, test and produce them commercially.

Since 1930 the efficiency of fuel utilization in passenger cars has increased by more than 30%, John M. Campbell and Dr. Lloyd L. Withrow of the General Motors Research Laboratories, Detroit, told the chemists. In addition to this improvement, high-compression ratio engines combined with high-octane gasoline of early-war aviation grade could push the efficiency 45% further.

Today's auto engine wastes 75% to 80% of the gasoline's energy and a gain of only 1% would save one to two millions of gallons of gasoline daily in the United States.

Present commercial gasolines sold at filling stations range between 70 to 90 octane and engines of newer passenger cars have compression ratios of about 7-to-1.

Sizable saving would occur with 8-to-1 engines and gasoline in the 96 to 98 octane range, a grade that the petroleum industry could produce to the extent of about 20% of its total gasoline volume.

Push the compression ratio up to 12 and 15-to-1, and new fuels chemically tailored by the newer methods of refining will be needed.

Experimental engines using these new fuels have been built and given road tests, several research groups reported.

The higher the compression ratio the better the antiknock quality of the fuel needed, R. W. Scott, G. S. Tobias and

P. L. Haines of the Standard Oil Development Co., Elizabeth, N. J., concluded.

Any upgrading of the fuel quality of auto engines should be established sufficiently ahead of the engine production so that the refiner can develop his methods of production. This was suggested by W. C. Offutt, J. E. Taylor and G. B. Swartz, Jr., of Gulf Research and Development Co., Pittsburgh.

Superfuel of 100 octane for the new engines of the immediate future can be made by adding a teaspoonful of tetraethyl lead to gasoline, Dr. H. A. Beatty and Dr. W. G. Lovell of the Ethyl Corporation, Detroit, told the chemists.

Science News Letter, October 2, 1948

MEDICINE

Temperature of Joints Taken with New Method

► THE TEMPERATURE OF JOINTS crippled by disease has been obtained by the use of a technique applied for the first time to man, the American Congress of Physical Medicine was told in Washington.

A needle from which the syringe is removed is inserted into the anesthetized joint. Then tiny temperature measuring units are threaded over this needle and are inserted two to three inches into the inner recesses of the joint.

This means that for the first time doctors will know what effect any treatment being used has on the crippled joint, Drs. Joseph L. Hollander and Steven M. Horvath, of the School of Medicine and Hospital of the University of Pennsylvania, pointed out.

"It appears significant," they reported, "that cold, pain, fear and even smoking produce an identical effect, i.e., the apparent constriction of the skin vessels and dilation of the vessels within the joints. Perhaps this observation may lead to an

explanation of how such factors aggravate or may even precipitate an arthritic process."

These studies were made on a group of 25 patients, of whom 21 had some form of arthritis. Tests showed that skin temperatures were fairly normal while joint temperatures were definitely elevated in cases of degenerative joint disease, chronic gout, and infectious arthritis.

This method is therefore of use in following the course of joint diseases and in evaluation of the effects on the joint temperature of such treatment as rest, exercise, physical therapy, drugs and X-rays.

Science News Letter, October 2, 1948

PSYCHOLOGY

Brain Operation Found To Reduce Intelligence

► REDUCTION of intelligence has been noted following a certain brain operation now sometimes used for epilepsy, it was reported to the American Psychological Association in Boston by Dr. Robert B. Malmo, of McGill University, Montreal, Canada, and the Allan Memorial Institute of Psychiatry.

The operation is one called gyrectomy

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and involves the removal of one of the convolutions of the frontal lobes of the brain.

Seven cases in which bilateral frontal gyrectomy was performed were studied as well as eight other cases in which another brain operation, lobotomy, was used. In lobotomy, the nerve connections between certain parts of the brain are cut.

A consistent drop in general intelligence, as measured by a standard mental test, the Wechsler-Bellevue Intelligence Scale, was found following the operations. There was a significant drop in ability to define words.

These cases, Dr. Malmo said, offered an excellent opportunity to study the effects on intelligence of these types of brain operation, because the patients had not

reached a state of personality deterioration before the operation.

Contrasted with Dr. Malmo's findings on the effects of the brain operations was the report by Dr. Lucille B. Kessler, of Traverse City State Hospital, Mich., on the effects of electric shock therapy on the intelligence of patients with the mental disease schizophrenia.

The 20 patients studied by Dr. Kessler were actually much more intelligent after the treatment than they were when they first entered the hospital.

The reduction in bizarre and incongruent thinking, the better attention of the patients to the test and their increased social awareness were, Dr. Kessler believes, important in producing the much better mental test scores.

Science News Letter, October 2, 1948

DENTISTRY

Overeating Harms Teeth

► **OVEREATING** is harmful to your teeth as well as to your figure, Dr. John H. Greene of Philadelphia warned the American Dental Association meeting in Chicago.

The perpetual muncher, who must have a midnight snack, or candy all day long, will usually have the most dental troubles, he pointed out.

Sweet desserts are also bad for you unless they are fruit or raw food, he said, because they reawaken your appetite. Raw foods, on the other hand, are good for you because they clean the surface of your teeth.

We know what is good for us, Dr. Greene asserted, but we continue eating only what we like. "We are too indolent to change or add to our good list unless sickness makes it imperative," he declared.

Science News Letter, October 2, 1948

Caries Despite Vitamins

► **THE POPULAR BELIEF** that a deficiency of minerals and vitamins in the diet will lead to tooth decay was debunked at the same meeting by Dr. Hamilton B. G. Robinson, of the Ohio State University College of Dentistry.

"It can be agreed that certain minerals

are important for formation of sound teeth but there is no clearcut scientific evidence that those minerals are necessary to prevent disease in mature teeth," he declared.

He termed misleading those studies that tried to show that decay is hastened by certain diseases or deficiencies. The investigators overlooked the fact that individuals who are of comparable age, race, region of residence and social status have the same tooth decay problems, he charged.

Dr. Robinson admitted the value of vitamin treatment in deficiency diseases such as scurvy and rickets, but vitamins as a weapon against dental disease he termed a case of firing "broad-sides at an unseen target."

Science News Letter, October 2, 1948

ASTRONOMY

Comet Ashbrook Probably Old Periodic Comet

► **FAINT COMET ASHBROOK**, 12th magnitude when found August 26 in the constellation of Aquarius, the water carrier, is probably an old periodic comet following a new path. (See SNL, Sept. 18).

It passed quite close to the planet Jupiter—within about 28,000,000 miles of it—in 1945, preliminary calculations by Dr. Leland E. Cunningham of Students' Observatory, University of California, show. At that time its orbit must have been considerably changed, he points out, which would account for failure to discover it earlier.

Further observations are needed before this comet can be definitely identified with Barnard's, Holmes' or other lost periodic comets.

"If the present orbit is approximately correct," Dr. Cunningham stated, "and if the comet does not fade unusually fast, it should be visible throughout its orbit."

Science News Letter, October 2, 1948

GENERAL SCIENCE

A.M.A. Says Health Plan Is Not Satisfactory

► **THE** American Medical Association's answer to the Federal Security Administration's ten-year program for the nation's health is that the "prescription" written by President Truman and F. S. Administrator Oscar Ewing would, if taken by the United States, prove more nauseating than curative (See SNL, Sept. 11).

Calling the statistics on which the 10-year plan is based "the same old figures that the proponents of government medicine have been launching at periodic intervals for the last 20 or 30 years," the editor of the JOURNAL OF THE A.M.A. (Sept. 25) states, in part, as follows:

"The amount of medical care that is given to most people of the world under their compulsory sickness insurance plans would never satisfy the people of the United States. The inevitable faults of these systems, which have been emphasized to the American physicians and to the American people for a good many years, are now coming vividly to light. Great Britain embarked in its new National Health Act on July 5. People in England may now go to the doctor without calculating the cost of the service. They may be supplied with spectacles and teeth without additional costs. They may have consultants and beds in hospitals without reference to individual payments for services rendered. That is what the National Health Act of Great Britain promised them. Do you think that they get it? No, indeed! They queue up to see the doctors formerly they could have seen by appointment. The doctors write formulas and prescriptions and reports many hours in advance of the time when they see the patients because otherwise they would never have time to see the patients. Many a physician is already satisfied that he cannot work under the Act. The unfortunate public have no way of knowing whether or not what they get is good medical service or something to make them think that they are being given attention.

"The greatest folly in the world is the manner in which Great Britain embarked on a nationwide health service without hospitals, doctors, nurses, drugs or money to supply what they promised, and an even greater folly would be the attempt to offer a similar service in the United States and to gulp the entire medical problem of the nation in a single swallow. Should the United States accept the prescription by President Truman and his consultant, Mr. Ewing, it would likely discover that the prescription had little of curative value and a great deal of the ultimate effect of ipecac or apomorphine (these, Mr. Ewing, are classified by the books on drugs as emetics)."

Science News Letter, October 2, 1948

Plastic Coasters and Tiles

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THE ADVANCEMENT OF SCIENCE, Vol. V, No. 18—*British Association for the Advancement of Science*, 77 p., paper, \$1.50 approx. Special issue devoted to the meeting of the British Association at Brighton.

BRITISH AGRICULTURAL BULLETIN, Vol. One, Number One—*British Council*, 40 p., illus., \$5.00 a year, single copies \$1.50. Intended "to put British knowledge and experience at the disposal of the farmers of other countries."

A CHRONOLOGY OF SCIENTIFIC DEVELOPMENT 1848-1948—K. Lark-Horovitz and Eleanor Carmichael—*American Association for the Advancement of Science*, 99 p., paper, free from Physics Department, Purdue University, Lafayette, Ind. Covering major achievements of the last century compiled for the Centennial Celebration of the AAAS.

CODES AND SECRET WRITING—Herbert S. Zim—*Morrow*, 154 p., illus., \$2.00. This book is not for the expert but just for fun; it covers common codes, breaking secret codes, secret languages, and invisible writing.

THE FLINT RIVER SITE—William S. Webb and David L. DeJarnette—*Alabama Museum of Natural History*, 87 p., illus., paper, 6 cents direct from publisher at University, Ala. Along the Tennessee River in Alabama there are some 340 shell mounds, remains of the oldest people in this region.

FRONTIER DOCTOR: The Autobiography of a Pioneer on the Frontier of Public Health—Samuel J. Crumrine—*Dorrance*, 284 p., \$3.00. The story of a physician who started his practice in the Cowboy Capital, Dodge City, Kansas, and led many a battle against the causes of the spread of disease such as the common drinking cup, the fly, and the roller towel.

THE LUNGFISH, THE DODO, AND THE UNICORN: An Excursion into Romantic Zoology—Willy Ley—*Viking*, Rev. ed., 361 p., \$3.75. A scientist distinguished for his experiments on rockets and his speculation about interplanetary travel makes a trip into a land of legend, imagination and zoological fact.

THE NEW BOOK OF FLIGHT—C. H. Gibbs-Smith—*Oxford University Press*, 288 p., illus., \$5.00. Beautifully illustrated with photographs is this review of modern developments in aviation with special emphasis on

British achievements. Has sections on rockets, jet propulsion and helicopters.

OUTLINES OF PHYSICAL CHEMISTRY—Farrington Daniels—*Wiley*, 713 p., illus., \$5.00. Material for a first course in physical chemistry which originated at the University of Wisconsin. Emphasis is on practical examples.

RADIO STATION MANAGEMENT—J. Leonard Reinsch—*Harper*, 177 p., illus., \$3.50. Beginning with "How to Get a Radio Station," there is discussion of many of the problems of running a station including programs. The place of radio in education is given attention.

SCIENCE ADVANCES—J. B. S. Haldane—*Allen and Unwin (Macmillan)*, 253 p., illus., \$3.00. A group of essays on topics as widely varied as the interests of the author and with his characteristic charm of expression.

SOCIAL ADJUSTMENT IN OLD AGE: A Research Planning Report—Otto Pollak with the assistance of Glen Heathers—*Social Science Research Council*, 199 p., paper, \$1.75. Discussing problems of interest to all except those who expect to die young.

YOUR SCHOOL DISTRICT—National Commission on School District Reorganization—*Department of Rural Education, National Education Association*, 286 p., paper, \$2.00; board, \$2.50. Of particular interest to schoolmen and those interested in school organization.

Science News Letter, October 2, 1948

ARCHAEOLOGY

Indian Shelter Shows 2,000 Years of Culture

➤ TWO THOUSAND YEARS of Indian history are represented in five feet of dirt in a rock shelter in West Virginia.

Stages in the growth of Indian culture from the beginning of the Christian to colonial times are shown in materials and tools left by the inhabitants of this shelter in the New River Valley. It was uncovered by an archaeological survey led by Ralph S. Solecki of the Smithsonian Institution.

This survey is exploring a valley in West Virginia to save as many of the relics of Indian and colonial history as is possible before the region is flooded by the Bluestone reservoir. The survey is a co-operative project of the Smithsonian, the National Park Service and the Corps of Engineers, Department of the Army. The area will be flooded in a few months.

The scientists discovered 42 Indian sites in the reservoir area. They consisted of village and camp remains, several earth and rock mounds, rock shelters and the locations of four forts built by white settlers. These forts, erected in the early 1770's, were used in the border warfare of the period.

The New River Valley area might be

considered the "Mason-Dixon" line of the eastern Indians—the border between the Iroquois on the north and the Cherokee on the south. The "Great Indian War-path" passed through the valley. Iroquois traveled this route in their raids on their southern enemies, the Catawbas.

Science News Letter, October 2, 1948

ICHTHYOLOGY

Shad Seem To Know Their Way Home, Study Reveals

➤ SHAD seem to know their way home, no less than the better-publicized salmon. Such is the indication of fish-tagging experiments reported in SCIENCE (Sept. 24) by Edgar H. Hollis of the U. S. Fish and Wildlife Service.

In 1941 he attached identifying tags to 2,466 young fish, mostly shad, which were later released in the Albemarle Sound region of North Carolina. The tags carried an offer of a one-dollar reward for return to the Fish and Wildlife Service.

Only three tags have thus far been returned, but they were all from fish taken within a ten-mile radius of the original "home" waters of the released young fish.

Science News Letter, October 2, 1948

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⚙️ **COMBINATION BROOM** and mop, recently patented, has what might be called a divided skirt which fits over the straw, split on one side so that the device may be used for sweeping. With the skirt closed, the combination may be used for mopping and scrubbing. The mop-cloth covering can be removed and washed.

Science News Letter, October 2, 1948

⚙️ **FISHING LINE** drying reel, a collapsible type that fits into a pocket-size case, can be opened and used anywhere without a fixed means of support. It has a fixed blade attached to a shaft and two blades which are set to rotate around the shaft. Braking means to prevent backlash in winding is provided.

Science News Letter, October 2, 1948

⚙️ **CAN CRUSHER** enables housewives to flatten emptied fruit and vegetable containers before disposal in the trash receptacle. This recently patented collapsible device, which may be fastened to a door-jamb, has two plates to hold the can, the upper one being movable downward with the help of a lever arm.

Science News Letter, October 2, 1948



⚙️ **PENICILLIN** can be inhaled in dry powder form by means of the transparent plastic device shown in the picture. There is also an interchangeable, dual-opening attachment to permit inhalation through

the nose. Penicillin powder is supplied in sealed, one-dose cartridges.

Science News Letter, October 2, 1948

⚙️ **MASTER KEY** to the study of musical scales is a business-letter-sized paper chart with a piano keyboard diagram at the top and a revolving dial below which can be turned to show the major scale of various keys. Information helpful to the beginner is printed on the chart.

Science News Letter, October 2, 1948

⚙️ **EXPOSURES OF MICROFILM** are automatically timed by an electronic device that takes account of the light and the condition of the record being photographed for use or preservation. The exposure is prolonged until enough light has reached the film to give the proper exposure.

Science News Letter, October 2, 1948

⚙️ **ELECTRICAL RECEPTACLE**, a locking plug-in type which children can not short circuit with wires or pins, is easily removed by a slight turning movement but can not be disengaged by a direct pull on the electric cord. This recently patented device has a contact spring fixed midway between the opposite ends of its base.

Science News Letter, October 2, 1948

• Nature Ramblings by Frank Thone •

➤ **WINTER** imposes a double strain on plants' survival capacities. Cold we think of readily enough; it is after all the most obvious thing about winter. To survive cold, plants must either keep their temperature above the freezing point of water, or they must prepare to endure freezing. More than that, they must be able either to prevent or to endure the repeated formation and thawing of ice crystals in their survival-organs, because every time water enters or leaves the ice-crystal state it expands powerfully, with resultant tearing effect on the tissues.

The other strain imposed by winter is that of drought. Exposed parts of plants must stand the buffeting of winds that are often very dry, and that will suck out every molecule of water the plant tissues release. In the West especially this is often a cause of great anxiety to winter-wheat growers. It is also one of the reasons why relatively little orchard planting is done in the Great Plains area.

In general, plants do not "keep warm under a blanket of snow and dry leaves,"

Survival in Winter



kindergarten rhymes to the contrary notwithstanding. Plant buds at ground level, rosette plants just above it, rhizomes and other storage-and-survival organs below ground, all become pretty cold when zero weather comes—almost as cold as the upper air. One thing the snow-and-leaf covering does for them, however, is slow down temperature changes and minimize their scope. Once cold, they stay cold, escaping the dangerous freeze-thaw-freeze fluctuations that would otherwise be imposed by the weather. The cover also prevents most

of the dessication that would otherwise take place.

More important even than ground cover is the state of the plant juices themselves. In survival-organs, whether buds or seeds, moisture does not exist in the thin, sappy state familiar in the softer summer condition of the plants. During the autumnal process of maturing or "hardening," much of the water goes out, leaving the complex solutions of sugars, proteins and mucilage-like substances much denser. And as any first-year chemistry student will tell you, the denser such solutions are the harder they are to freeze.

Fuzzy or varnish-like coverings on buds of woody plants are much more useful in checking evaporation from the little knots of leaf- and flower-beginnings within than they are in keeping them warm. They are also useful in preventing the intrusion of moisture during the winter rainstorms that subsequently freeze into glaze ice, an especially trying form of winter stress on plants.

Science News Letter, October 2, 1948

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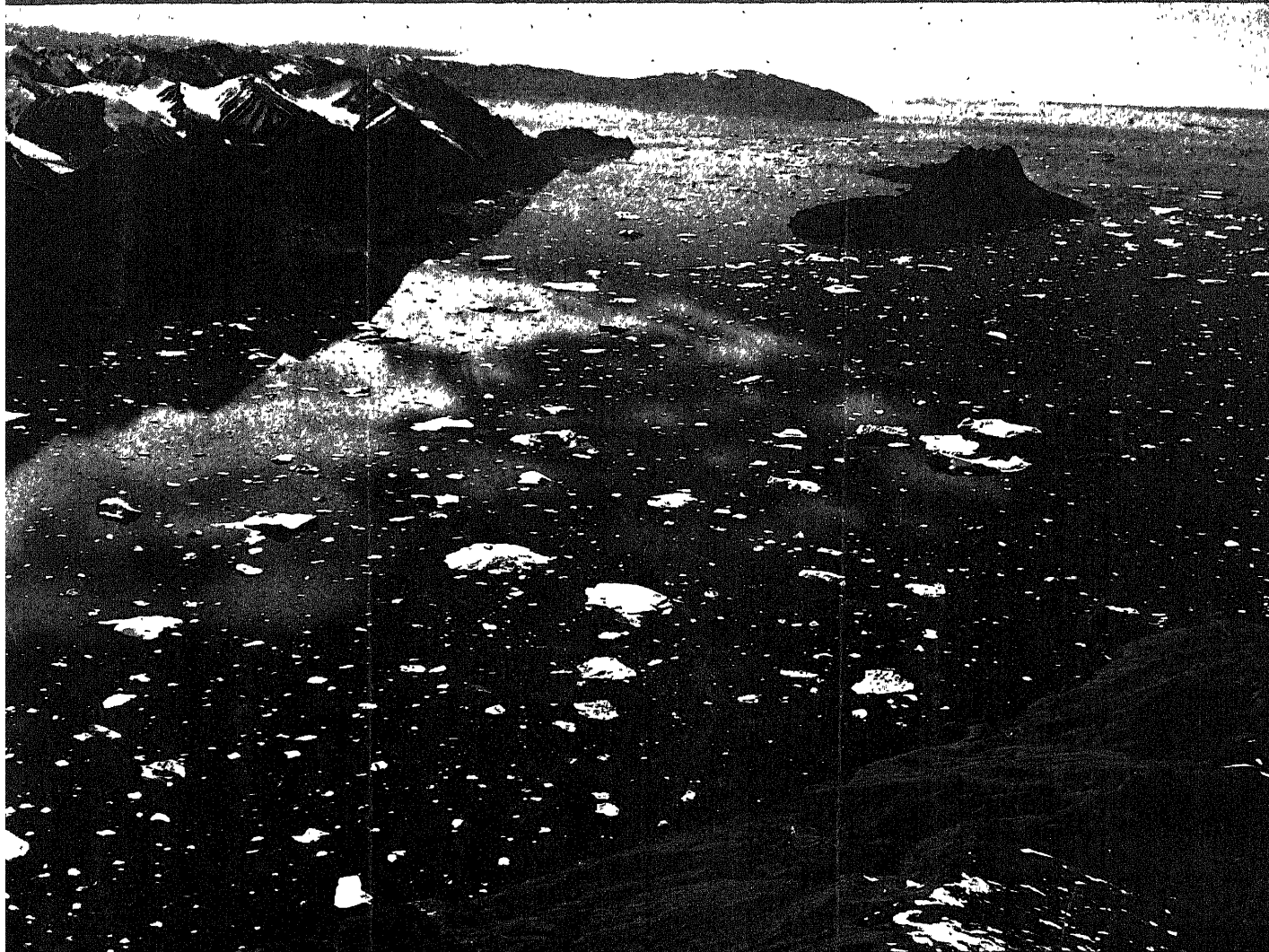


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SCIENCE NEWS LETTER



THE WEEKLY SUMMARY OF CURRENT SCIENCE



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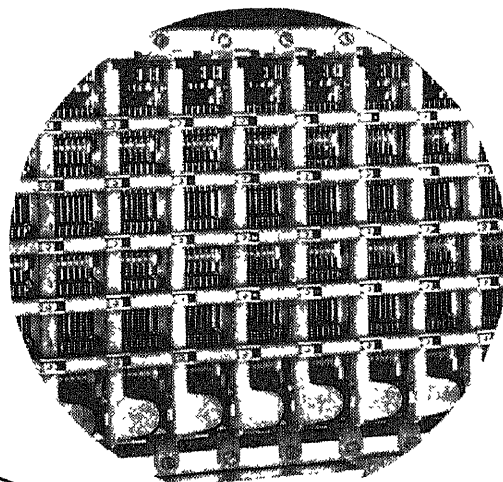
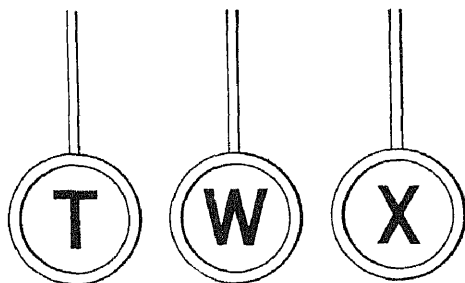
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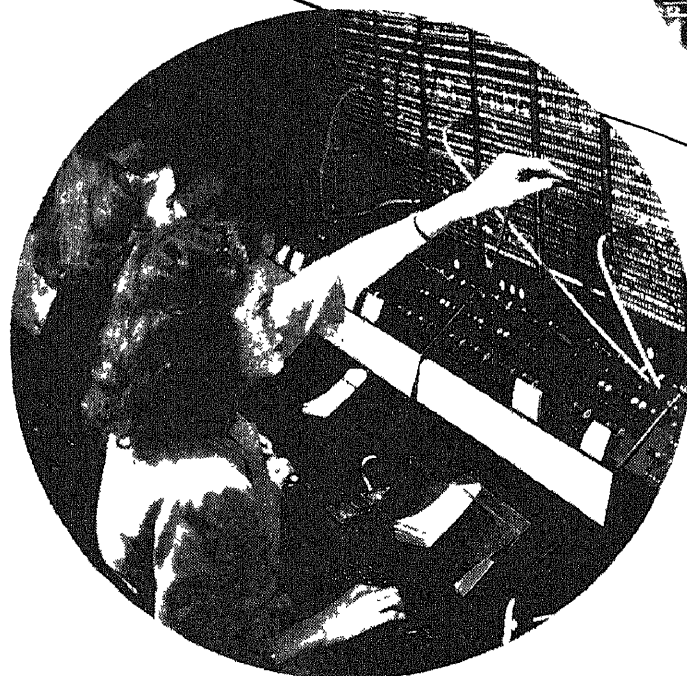
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MEDICINE

Check Jaundice in Blood

Ultraviolet ray treatment of blood plasma will prevent this virus disease from being transmitted from the blood donor to the patient getting a transfusion.

► THE DANGER of getting jaundice from blood plasma or blood serum can be prevented by ultraviolet ray treatment of the plasma or serum, five medical researchers report in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 2).

The five are Drs. Mercer C. Blanchard, Joseph Stokes, Jr., Bettylee Hampil, George R. Wade and John Spizizen of the University of Pennsylvania School of Medicine and the medical research division of Sharp and Dohme, Inc.

The jaundice they studied is not the kind that comes in epidemics such as attack school children, but the kind called homologous serum hepatitis which attacked many battle casualties some months after receiving blood or plasma transfusions or both. The disease is due to a virus.

There are no laboratory tests to detect this virus in plasma or serum so there is no way of knowing whether pooled plasma from many donors contains the virus.

The Philadelphia scientists gave to 15 human volunteers serum known to contain the virus, because it came from the blood of persons in the early stages of the disease. Of the 15, almost half, or 47%, developed the disease. Another 11 volunteers were given almost double the dose of serum from the same lot, but which had first been irradiated with ultraviolet. None of these showed the slightest sign of the disease during an observation period of five months.

Tests of irradiated serum and plasma show that it does not undergo chemical changes which could cause allergic reactions. The scientists therefore conclude that the method is "practical, safe and effective," and that their results strongly favor the routine use of ultraviolet treatment of serum and plasma under properly standardized conditions.

Science News Letter, October 9, 1948

PHYSICS

Food Sterilized by Rays

► BOTH X-RAYS and cathode rays offer new and effective means of producing sterilization of bacteria, changes in the structure of living tissue and chemical changes.

Rays of either kind produced at high voltages destroy strong concentrations of bacteria, yeasts and molds, it was discovered in experiments conducted by a group of Massachusetts Institute of Technology scientists. Drs. J. G. Trump, R. J. Van de Graaff, Cecil G. Dunn, William L. Campbell, Harvey Fram and Ardelia Hutchins report their findings in the JOURNAL OF APPLIED PHYSICS (July), a publication of the American Institute of Physics.

The sterilizing effect of these rays was very good in the cases of raw and pasteurized milks, soil and waters. But, strangely enough, sterilization of apple juice proved much more difficult.

The rays will destroy enzymes, chemicals in the body which will encourage other chemicals to react without being affected themselves. Butter and olive oil treated with X-rays and cathode rays became rancid more quickly. The orange-yellow color of the butter is gradually destroyed as the radiation is increased.

In one experiment grapefruit and orange juice were irradiated to see if the vitamin C they contain would be destroyed. The

rays markedly reduced the vitamin C concentration.

The milk-sterilizing experiment which used cathode rays at 2,000,000 electron volts may result in a better, more efficient method for sterilizing milk than any found so far. Before the cathode rays were directed on the milk, it contained about 37,000,000 bacteria to a milliliter (approximately 61 thousandths of a cubic inch), afterwards only two bacteria were found in a milliliter.

The changes that the X-rays and cathode rays cause are due to the disturbance aroused in the atoms of the receiving substance when the particles in the rays hit it. In the X-rays the energy is carried by photons, or "light darts," little lumps of light energy whose existence was first suggested by Einstein. In cathode rays electrons do the same job.

Although X-rays are more penetrating than cathode rays the latter are several hundred times more efficient. These rays can be easily controlled so that scientists know exactly how many electrons are hitting the substance at which they are aimed. In addition, all the electrons aimed at the substance from a cathode ray source will hit it while with an X-ray source only a small fraction of the energy formed is

actually delivered to the substance being irradiated.

One method commonly used for killing bacteria is heating them to high temperatures. By the use of X-rays and cathode rays sterilization is accomplished with a rise in temperature of only two degrees Centigrade (3.6 degrees Fahrenheit).

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ARCHAEOLOGY

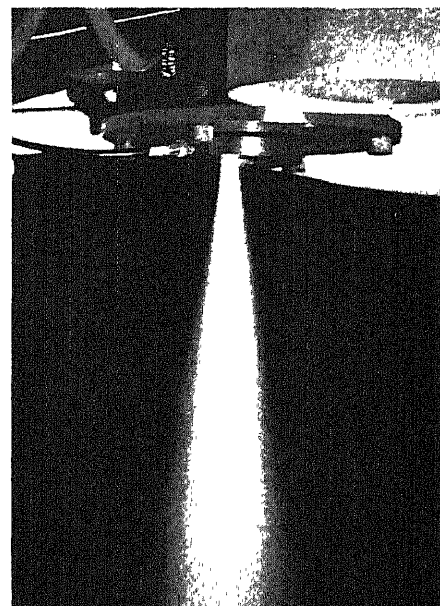
Famous "Norse" Tower Still Remains Mystery

► THE FAMOUS round stone tower at Newport, R. I., claimed to be of Viking origin by some and hotly disputed by others, has been given its first professional archaeological going-over—and it keeps its secret still. Another season's digging will be needed to come close to a settlement of the generations-old dispute, in the opinion of William Godfrey, Harvard archaeologist who carried on the work this year.

With funds provided by an anonymous donor to the Preservation Society of Newport County, Mr. Godfrey drove a trench from 78 feet outside the tower straight through one of its arches and out the other side. Digging was carried down to bedrock, or to a layer of heavy, blue-gray clay.

Nothing of significance was found in the ground outside the tower, because of heavy grading operations late in the nineteenth century.

The tower itself stands on a foundation



CATHODE RAY BEAM—High energy electrons in this beam are capable of killing bacteria and causing chemical changes in food. The beam is visible because some of this tremendous energy is given off in the form of light.

of tumbled boulders, which were rolled into a circular trench. On these, low masonry drums four feet in diameter were built, and on the drums the eight supporting pillars of the tower were erected. Arches carried the closed circular upper room at the top.

Mortar was a crudely made mixture of sand and lime, of a type that might have been made at any time from the eighth century until the invention of portland cement. The tower room had two coats of plaster, one white, one gray, of the same kind of material.

Beneath the tower was a layer of charred wood, covered thinly with soil and mixed with fallen plaster. This was left by a fire, when British soldiers burned the tower's floor during the Revolutionary War.

Digging in the soil under the tower turned up quantities of pottery and glass

fragments of Colonial date, together with pennies dated from 1696 to 1700, also one Connecticut penny dated 1787, and some nails, buttons and other miscellaneous metal objects. There was nothing that could be identified as Norse, or of earlier than late seventeenth-century date.

It is known that Governor Benedict Arnold of the Colony of Rhode Island, grandfather of the well-known Revolutionary War general, had a wooden windmill on the tower. However, it is not known whether he put up the stone structure, or simply took advantage of it because it was already there.

So as of this date, the riddle of the tower, which inspired Longfellow's famous poem, "The Skeleton in Armor," and many reams of less noteworthy writing, still remains unsolved.

Science News Letter, October 9, 1948

the Expedition's activities (SNL, Aug. 28, Sept. 4).—Bill Terry, Field Executive, U. of Calif. African Expedition.

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There are some 1,400 separate parts in an electric refrigerator.

A federal soil scientist says that there are some 1,300,000,000 acres of *unused land* in the world that could be developed for crop production.

A standard-gauge *railroad* at Climax, Colo., is 11,319 feet above sea level; this is the highest elevation at which any standard-gauge American railway operates.

Letters To The Editor

Gardens Out of Swamps

"Wasting Wet Acres" (SNL, Aug. 28) is a most timely article and should have the close attention of all sincere conservationists!

The waters of the swamp lands are saturated with the minerals necessary for plant growth. To drain these waters off is practically to leach out many of the mineral elements and thus impoverish the land. True, the excess of water acts as a deterrent for the growth of many plants, which are acclimated to drier soil. But how about hydroponics?

Would it not be possible by the addition of certain salts to convert a swamp into a great hydroponic garden?—Adolph H. Weber, Berkeley, Calif.

By no means are all wet areas rich in minerals needed for plant growth. Acid-

water bogs (as distinguished from neutral-water swamps) are notoriously poor in minerals; either they are locked up in unavailable forms, or they just plain aren't there at all, having been leached out long ago. In some swamp areas, too, the leaching effect is pretty bad.

Another thing: Hydroponics, as practiced now, is better adapted to rainless, or nearly rainless, climates. . . . How to modify hydroponic methods to make rain an advantage instead of a drawback will probably take some hard work by experts.

Good Coverage

This is just a note of appreciation for all of the fine stories you are doing for the University of California African Expedition in Science Service publications. We all sincerely appreciate the accurate reporting and good coverage that you have given to

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MEDICINE

How can the transmission of jaundice in blood plasma be prevented? p. 227

How have good results with penicillin been obtained in colds? p. 231

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PUBLIC HEALTH

What are the two new systems for ranking leading causes of death? p. 229

PUBLIC HEALTH

New Ranking for Killers

New system which ranks leading causes of death by working years lost topples present standing of heart diseases and cancer from top position.

➤ **HEART DISEASE** as a leading cause of death takes second place, cancer drops to fourth and pneumonia moves up into third place. These are the rankings under a new system worked out by Dr. Frank G. Dickinson, director of the Bureau of Medical Economic Research of the American Medical Association.

This new measure ranks leading causes of death by working years lost. By this yardstick, accidents are the leading cause of death between the ages of 20 and 65, the working years of American people.

Life years lost constitute another new measure used to gage the importance of the different causes of death. That is, if statistics show that you have a life expectancy of 70 years and you die at 50, then 20 life years are lost to you and to society.

Using death rate figures for 1945, Dr. Dickinson said that according to the new measure "A complete cure for heart diseases (or cancer) in 1945 would have added fewer thousands of working years to the total life expectancies of the American people than would the prevention of all accidental deaths."

On this basis, he suggested, emphasis on accident prevention would be a means of lengthening life and increasing productive power.

It also shifts the responsibility to the shoulders of the layman. It is the layman's job to prevent accidents, Dr. Dickinson declared.

The standard method of ranking leading causes of death by the number of people who die from each cause is an unsatisfactory index to the loss suffered by society and the age of the victims, he pointed out in the *MEDICAL ANNALS OF THE DISTRICT OF COLUMBIA* (Sept.).

Numerically, the seven leading causes of death in 1945 were in order of importance: heart diseases, cancer, injuries to the brain, accidents, diseases of the kidneys, pneumonia, and tuberculosis.

These same diseases, measured by the number of life years lost, were in order of importance: heart diseases, accidents, cancer, pneumonia, brain injuries, tuberculosis, and diseases of the kidneys.

When measured in terms of working years lost, they were: accidents, heart diseases, pneumonia, cancer, tuberculosis, brain injuries and kidney diseases.

"The task of the physician is not to eradicate death from the face of the earth, but to prolong life and to relieve pain," Dr. Dickinson concluded.

"Regardless of the measure used, the success of the American physician in car-

rying out his task cannot be denied. The layman, unfortunately, has not done his share to prolong life by reducing the surprisingly high totals of life years and working years lost from fatal accidents."

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METEOROLOGY

Atomic Age Smoke Signals Sent from Weather Tower

➤ **FIRST** atomic age smoke signals have been sent from the giant weather tower at the Brookhaven National Laboratory in Upton, N. Y. (See SNL, July 31.)

The smoke "signals," formed by a harmless fog, are used to trace the speed and course of wind over the laboratory. This study will permit sending off harmlessly into the air waste radioactive gas from a new atomic pile when it is completed.

Smoke from the 355-foot tower is photographed by weather observers in mobile stations. The fog behaves in the air in the same way the radioactive gases will.

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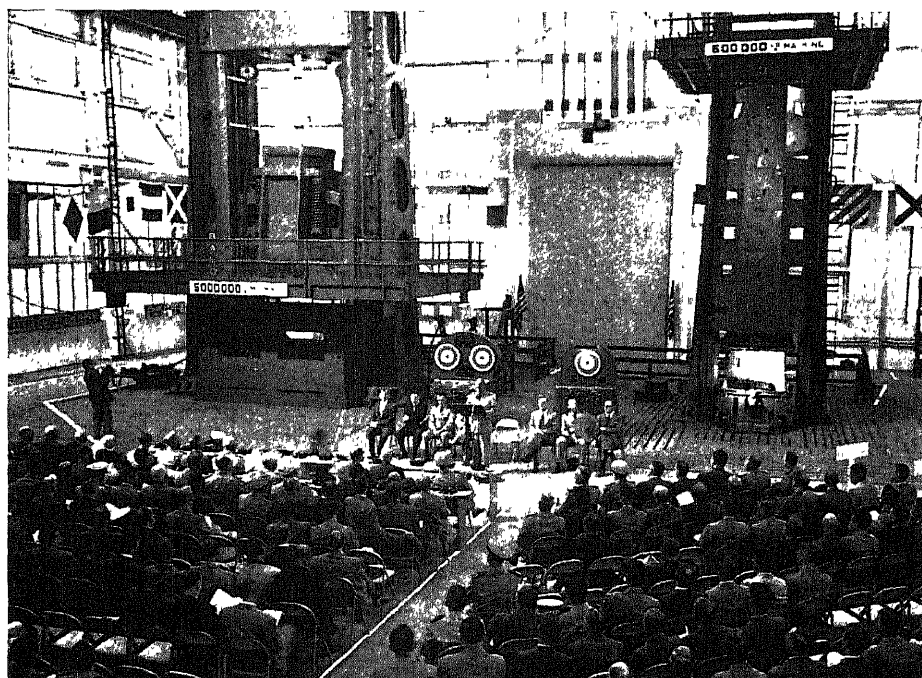
TECHNOLOGY

Chigger-Proof Clothing Now Stands Many Washings

➤ **CHIGGER-PROOF** clothing for outdoor workers and vacationers that will keep its protective power through as many as seven washings can now be produced, entomologists of the U. S. Department of Agriculture announced. The garments are impregnated with two hitherto unused chemical compounds, phenyl carbonate and x,x'-dichlorodiphenyl ether.

The new chigger-proofing method is a postwar development in a program undertaken by the Department of Agriculture for the Army during the war. It was particularly necessary to protect troops in the Southwest Pacific area against the attacks of bloodsucking mites that carried an insidious disease known as scrub typhus. The compounds first used, while successful against the mites, would not stay in the fabric when it was washed.

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WORLD'S LARGEST TESTING MACHINE—This 5,000,000 pound machine will be used for testing the lightest weight aluminum and magnesium structures that aeronautical engineers can design. It will enable engineers to measure the loads that the largest and strongest airplane structural elements will withstand; to modify their design and minimize weight; and to solve the principal problems of designing full-scale aircraft on the basis of small-scale model design and tests. It was demonstrated the first time officially in the Aeronautical Structures Laboratory at the Philadelphia Naval Base.

MEDICINE

Public Must Aid Doctors

In order to solve the problem of the shortage of professional personnel, full support of government and the man on the street is needed.

► **FEDERAL**, state and municipal governments, private philanthropists and the man in the street must all chip in to solve our most urgent medical and health problem, the shortage of professional personnel, Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, declared at the meeting of the Medical Society of the District of Columbia in Washington. "The total problem of medical education is so vast," he said, "that we should not expect it to be solved with less than active support from all sources."

Medical students of the future will again receive part of their training in the patient's home, as they did when they served their apprenticeships with the old family doctors, Dr. William S. McCann, of the University of Rochester School of Medicine and Dentistry, predicted at the same meeting.

This is part of the major change in trend of medical education toward emphasis on the emotional and sociological phases of sickness.

A change in the rules for postgraduate training set by specialty boards which certify doctors as competent to practice as experts in a special field of medicine must also come, Dr. McCann believes, as part of the evolution of medicine. Without such change he sees the downfall of the boards which have in the past done much to raise the level of competence in the specialties.

The current plans of the U. S. Public Health Service, Dr. Scheele stated, follow

three major trends which were established before World War II and have been extended during the postwar period. These are: 1. expansion of research in medical and related sciences; 2. rapid development of public health programs to accomplish specific purposes, such as tuberculosis control or control of degenerative and other chronic diseases; 3. expansion of Federal support for these activities, primarily through aid to state agencies, public and private non-profit institutions, and individual professional men and women.

"The recent emphasis on cancer, cardiovascular diseases and mental health are logical developments in public health," he said.

A continuous rise in death rates from these diseases has accompanied the aging of the population, he pointed out. For the past 15 years there has also been an increasing volume of mental disease and psychic maladjustment.

"As yet," he said, "we have done very little to deal with the major problems of adults or to change these mortality trends. All of the new medical knowledge and skills have added only two and a half years to the life expectancy of the 40-year-olds. The major steps in public health during the next few years must be toward prevention and control of degenerative and other chronic diseases, including mental disease."

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from the new method for getting rid of insect stowaways, aside from sparing passengers the discomfort of the aerosol-mist fumigation at the end of a transoceanic ride. It will not only stop, much more effectively than the aerosol mist, any unintentional international traffic in insects, but will also kill insects stealing interstate rides, which is now done ineffectually or not at all.

A minor benefit will be the elimination of the occasional bees, yellowjackets and wasps that now make air passengers uneasy by their buzzing buttings against plane windows.

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MYCOLOGY

Fungus Growths Found To Damage Paint Surfaces

► **PAINTS** and certain types of plastic surfaces can be damaged and made unsightly by the growth of a widely distributed mold to which little attention has hitherto been paid. Inroads of this fungus, which is known by the deceptively melodious name of *Pullularia*, have been studied in Miami by Dr. Ernest Shaw Reynolds, industrial plant physiologist.

Pullularia spots were first noticed on a series of painted test panels, exposed to determine the resistance of various kinds of paint to fungus attack and to weather conditions generally. They were black, like soot spots, but would not brush off. On microscopic examination, they proved to be made up largely of dark spore masses. This color characteristic may have been responsible for its name, which is from a Latin word meaning dusky.

Dr. Reynolds grew cultures from spores in the laboratory, and tested the fungus under controlled conditions. It proved ready to attack paints and one type of plastic coating, and was much less discouraged by fungicidal chemicals than several other common types of mold.

A search of the botanical literature showed that *Pullularia* has been found all over the world, from flax-processing establishments in New Zealand to paper mills in Finland. It has been found associated with diseased conditions in certain warm-climate fruit trees, though it has not been definitely found guilty of causing the diseases. Its newly discovered role as attacker of paints must now be taken into account.

Science News Letter, October 9, 1948

ENGINEERING-AERONAUTICS

Greater Plane Range Seen From New Type of Engine

► **LONGER RANGES** and more power for future planes are predicted from the announcement of a new combination aircraft engine.

The new engine combines a reciprocating engine with three turbines. It is ex-

ENTOMOLOGY

DDT Coatings in Planes

► **INSECTS** hitch-hiking in airplanes will be "taken for a ride" in the sinister sense if experiments now being conducted by the U. S. Department of Agriculture work out as well as they promise.

Instead of subjecting the interior of the plane (including the passengers) to a fuming with an aerosol bomb on landing, as at present, the idea is to spray everything with an invisibly fine but lasting film of a deadly DDT-pyrethrum combination that will knock down and kill any insect alighting on it. Laboratory tests have been satisfactory, and field tests are now in progress on several airplanes.

As in the ordinary household aerosol bomb, the pyrethrum is counted on to score a quick knockdown, followed by slower but surer death from the DDT. The tests so far conducted have shown that the

solution used will remain effective for eight months or more under laboratory conditions. Shorter useful life under ordinary operating conditions is expected. The solution is applied either as a spray or an aerosol.

In one test described by P. N. Annand, of the Bureau of Entomology and Plant Quarantine, a plane full of Army officers (considerately forewarned) had loosed upon them an assorted lot of flies, mosquitoes, grasshoppers, plantbugs and Mexican bean beetles. Life in the plane was far from dull—for about two minutes, during which the insects contacted the poisoned walls. At the end of three minutes, the six-legged fellow-travellers were all on their backs, waving their legs. At the end of a half-hour they were all dead.

Considerable advantages are expected

pected to give 20% more range on the same fuel than conventional engines. It is manufactured by the Wright Aeronautical Corporation, a division of the Curtiss-Wright Corporation. Wright engineers said that the new engine is the most powerful of its kind in the world.

A \$32,000,000 contract from the Navy was announced for construction of the new Wright Turbo-Cyclone 18 Compound engine plus standard plane engines.

Science News Letter, October 9, 1948

CHEMISTRY

Hydrogen and Helium Have Same Atomic Weight

➤ **HEAVYWEIGHT HYDROGEN** and lightweight helium are the newest research materials available to scientists from atomic energy piles.

Both the varieties of the two elements have the same atomic weight, three. Ordinary hydrogen, the lightest known chemical element, has an atomic weight of one, while helium, second lightest element, is commonly four.

Called tritium, hydrogen three is the only radioactive form of the element. It can be combined with oxygen to form heavy heavy-water, a different compound than the better known heavy-water.

Helium three is not radioactive and is extremely rare. There is about one-millionth as much helium three in nature as there is of the familiar helium atoms.

Both the new materials are produced at the U. S. Atomic Energy Commission's Argonne National Laboratory in Chicago.

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GENERAL SCIENCE

Iceberg "Census" Taken From Coast Guard Plane

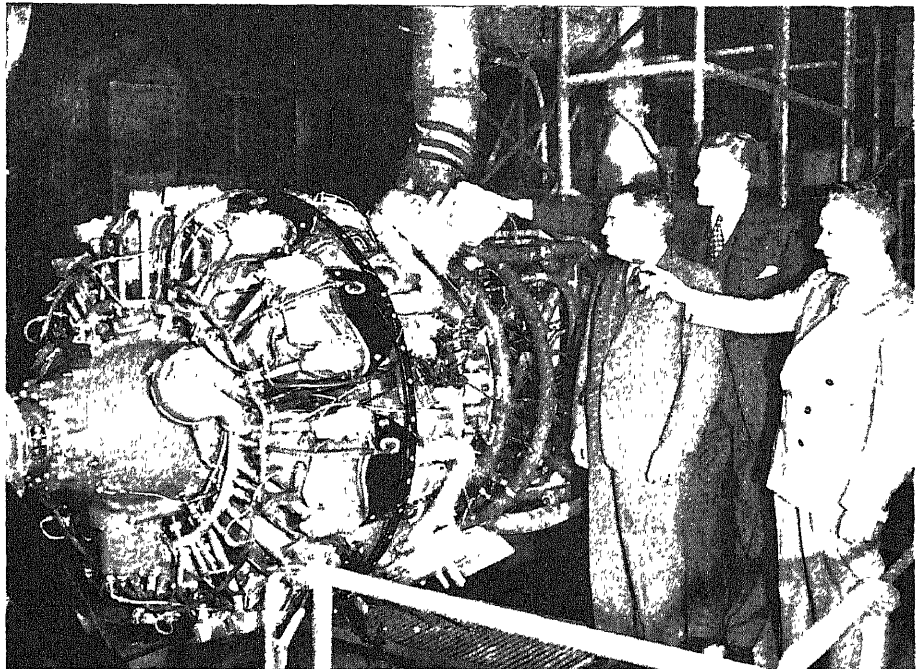
See Front Cover

➤ **THE ANNUAL ICEBERG "census"** was made from the air for the first time this year, the U. S. Coast Guard said.

The census is the post-season survey of icebergs, made as the last phase of the International Service of Ice Observation. By counting the thousands of icebergs, scientists can predict the number that may invade shipping paths during the next three years.

A Coast Guard converted B-17 plane was used to make a photographic survey, shown on the cover of this week's *SCIENCE NEWS LETTER*, of the many icebergs in the Baffin Bay area, source of the icebergs which move southward to menace North Atlantic shipping. With this more accurate record of the Baffin bergs, Coast Guard officials hope to be able to get more accurate predictions of iceberg activity. This will help provide more protection to ships in coming seasons.

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COMBINATION AIRCRAFT ENGINE—It combines a reciprocating engine with three turbines and is credited with being the most powerful aircraft engine of its type in the world. Three officials of the Wright Corporation are shown inspecting the new engine.

MEDICINE

Penicillin Fights Colds

Inhalation of the antibiotic in dust form has proved beneficial in patients with bad colds and more serious diseases of the breathing tract.

➤ **GOOD RESULTS** in treating common colds, chronic sinusitis and other, more serious diseases of the breathing tract with inhalations of penicillin dust are reported by three Chicago physicians in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Oct. 2).

The physicians are Dr. Louis Krasno of the University of Illinois Medical School and Drs. Mary Karp and Paul S. Rhoads of Northwestern University Medical School.

Common colds were "considered cured" in 42% of the 169 patients treated, with 38% judged as three plus improved. Stuffiness and congestion of the nose often improved immediately after treatment and sometimes the pain of an acutely sore throat was lessened within one-half to one hour after treatment.

Greatest merit of the treatment, the doctors believe, is in bronchitis and bronchiectasis. Twelve of the 38 patients with bronchiectasis were considered much improved and another 17 moderately improved.

The inhalations of penicillin dust were given one to three times daily, three to six

minutes usually being required to inhale the amount used. Patients were not allowed to eat or drink for one hour after each inhalation, to avoid washing the penicillin dust from the back of the throat. A mask over nose and mouth was used at first, but later patients were given the inhalations through a plastic mouth inhaler. This keeps the penicillin dust from coming in contact with the skin of the face and thus reduces the possibility of allergic reactions. These occurred in only three to six percent of 357 patients.

Treatments can be given at home and in the doctor's office as well as in the hospital. This permits the patient to "go about his business without loss of time and with minimum expense," the doctors report, adding that before the use of this treatment many patients with chronic lung disease were not given adequate treatment because of the expense of prolonged hospital stay and equipment.

A total of 517 patients have now been given the penicillin dust inhalation treatment.

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ENGINEERING

Mapping Machine Charts Invisible Fields of Force

➤ AN AUTOMATIC field mapping machine which has nothing to do with the work of land surveyors may find important laboratory uses, General Electric Company scientists predicted.

The machine maps the invisible field of force surrounding electrically-charged pieces of metal. It was developed by General Electric, but is not yet available commercially.

Solving of problems in such fields as magnetics, fluid streamlining, heat conduction and airplane propeller blade torsion may be speeded by the new device.

Metal specimens are connected to a power supply and placed in water for tests with the mapping machine. Three tiny probes register the voltage, while the motion of the probes is recorded as lines on a drawing board by a four-foot metal arm.

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PSYCHOLOGY

Accuracy of Plane Speed Estimates Is Studied

➤ CAN YOU WATCH a B-26 plane fly overhead and estimate how fast it is going?

Even officers in the Army Anti-aircraft have trouble in making accurate estimates, the Army Psychological Association learned from Drs. William C. Biel of the Aero Medical Laboratory, Wright-Patterson Air Force Base, and Guy E. Brown, Jr., of Eastern Washington College of Education.

An officer who must aim a gun at a fast-moving plane will be influenced in guessing its speed both by his knowledge of what the plane can do and also by how fast the plane is flying. Planes flying at speeds lower than their ordinary cruising speed will be judged to be flying faster than they are, experiments with 20 officers showed the psychologists.

As the plane is flown at higher and higher speeds, there is a consistent tendency to underestimate its speed more and more.

Difference in direction of the courses had no significant effect on the accuracy of the estimates, it was found.

The errors in speed estimation are great enough to introduce large errors in anti-aircraft gunnery when gun sights are used with which speed of target must be estimated.

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ARCHAEOLOGY

400-Year "Lost" Period In Indian Prehistory Filled

➤ THE 400-YEAR "Dark Ages" period in European history, stretching from the fall of Rome to the beginning of the Middle

Ages, had its counterpart at about the same time in the prehistory of an important Indian culture. This gap between A. D. 500 and 900 in the known story of the long-vanished Mogollon Indians of the Southwest has been filled in by discoveries made in New Mexico during the past summer, stated Paul S. Martin, anthropologist of the Chicago Natural History Museum.

Previous excavations of the archaeological traces of the Mogollones had shown stages in their cultural evolution from a nomadic hunting people to dwellers in snug pit-houses—in effect, roofed-over cellars. This stopped abruptly at A. D. 500 and took up again at A. D. 900.

The diggings described by Mr. Martin turned up new pit-houses in which the Mogollones lived during the hitherto unknown interim. They were deep, rectangular excavations, with long, stepped-up passage-entrways facing east. Cupboards cut into the earthen walls were used for storing supplies, instead of pits in the floor in the earlier houses hitherto known.

Dishes and kitchenware, represented by pottery fragments, also show an advance in culture. The rather unattractive brown ware found in the older pit-dwellings is replaced by more delicately wrought, pleasingly decorated utensils. The Mogollones were beginning to be civilized.

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ANTHROPOLOGY

Columbus Met Indians of Peaceful Disposition

➤ WHEN COLUMBUS first landed in the New World, he met a relatively hospitable, peaceful and nearly civilized group of Indians.

This is the finding of Dr. Irving Rouse of Yale University in a new study of the Arawak Indians who lived in the West Indies at the time of Columbus. The new volume on the Arawaks is one of a series of publications by the Smithsonian Institution which is making an exhaustive study of South American Indians.

The apparently peaceful Arawaks, a tribe of small farmers, were early victims of the invading Spaniards, who took them as slaves and forced them to work in gold mines. They also introduced European diseases which took a high toll. One village of 200 on the British island of Trinidad in the West Indies is the main surviving settlement of Arawaks today.

About the time of Columbus, a group of Arawaks settled in Florida. They appear to have been the original searchers for the "Fountain of Youth," but the fate of these early invaders of Florida is unknown.

In most respects, the Arawaks were like many other American Indian tribes. They wore little clothing and bathed often—more often, in all probability, than the Spaniards. But like many other Indian groups, they were virtually wiped out.

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ARCHAEOLOGY

Egyptian Scientists Are Aiding U.S. Expedition

➤ TWO LEADING Egyptian scientists, Prof. Gelal Hafez Awad and Prof. Mohamed Mitwally, both of Farouk I University at Alexandria, have been participating in the work of the University of California African Expedition, with field headquarters at Nairobi, Kenya.

Prof. Awad, a geologist, has made extensive collections of specimens and field studies in Kenya and on the island of Zanzibar, where special facilities were made available by the Sultan. Especially good hunting was found among fossils of ammonites, which were coil-shelled distant cousins of the present-day pearly nautilus that lived some 200,000,000 years ago.

Prof. Mitwally, anthropologist, made physical measurements of more than 1,200 African natives, representing nine different tribes and racial groups, over territory ranging from Zanzibar to Lake Victoria. Among the peoples on whom records were obtained are Jaluo, Bantu, Kavirondo, Kikuyu, Kamba, Nandi, Digo, Giriama and Zanzibarese.

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GENERAL SCIENCE

New Group To Study Conflict and Cooperation

➤ SCIENTISTS interested in the study of conflict and cooperation at all levels of life are now organizing a permanent body to make their own cooperation more effective. Formation of the new society, which as yet has no name, was decided upon at a special symposium held recently in Washington. At this meeting a comparison of views and working methods by botanists, zoologists, anthropologists, sociologists and workers in several other scientific fields convinced the participants that they had so much in common that a grouping for joint action would be justified.

Immediate goal of the new society will be to discover, as objectively as possible, the extent to which conflict among living organisms, whether microbes or men, is inevitable and even useful, and to what extent cooperation exists in the natural world and what its consequences are. Ultimately it is hoped to find possible applications of the facts thus discovered to the problems of conflict among human individuals, groups and nations.

Chairman of the organizing committee is Dr. Edward F. Haskell of the Society for Applied Anthropology, with headquarters in New York.

Science News Letter, October 9, 1948

E FIELDS

MEDICINE

Growing Old Has Some Health Advantages

➤ GROWING OLDER has some advantages on the health side, Dr. Wingate M. Johnson, of the Bowman-Gray School of Medicine, Wake Forest College, told members of the Medical Society of the District of Columbia, meeting in Washington.

Older people usually have much better resistance to infectious diseases, he pointed out. Migraine headaches usually disappear soon after middle life. Diabetes is less severe in the old than the young. Cancer progresses much more slowly.

While the muscles become flabbier, the bones more brittle and the joints stiffer, vigorous exercise is seldom required of the older man, Dr. Johnson said. Hence there is less demand on his muscles and he is not so apt to break his bones.

Science News Letter, October 9, 1948

VETERINARY MEDICINE

Find Metal in Animals With New Apparatus

➤ IF YOUR favorite cow inadvertently swallows a bit of baling-wire, or stops a bullet fired by some trigger-happy deer-hunter, it may soon be possible to locate the offending piece of metal with a device built on the same principle as a wartime land mine locator. The new apparatus, which still awaits clinical tests by veterinarians of the Army's Medical Department, was developed in Fort Monmouth, N. J., by technicians of the Army Signal Corps.

As in the mine locator, a flat "search head" is passed over the area where the presence of offending metal is suspected. Interference with the device's magnetic field by metal causes a change in the sound heard by the user in his ear-phones.

If successful, the apparatus should be a great help to veterinarians generally, since X-rays of animals are difficult to make and frequently not adequate.

Science News Letter, October 9, 1948

ENGINEERING

Humidity Recording More Accurate with New Device

➤ "... NOT THE HEAT but the humidity" may be recorded more accurately in the future, thanks to a new device developed at the National Bureau of Standards.

A humidity test apparatus, designed by Arnold Wexler and developed under the sponsorship of the Department of the

Navy's Bureau of Ships, produces air of known humidity. This is used to calibrate the instruments used for making readings of the humidity. The new apparatus was developed primarily to test the humidity-sensing elements in the radiosondes used to collect atmospheric data for weather forecasting. Other applications for the testing equipment may be found in the fields of refrigeration and air-conditioning, it is predicted.

A divided flow of air at velocities of up to 1,500 feet per minute is used in the apparatus to produce air of known relative humidity at temperatures from zero to minus 40 degrees Centigrade.

Dry air entering the apparatus is divided by a proportioning valve so that part of it is kept dry while the rest is saturated by passing over trays of ice. In a mixing chamber, the dry air is combined with the saturated air in predetermined proportions to produce the desired humidity.

Science News Letter, October 9, 1948

ENGINEERING

Coal-Burning Gas Turbines Are Best for Locomotives

➤ GAS TURBINES, burning coal, may power locomotives on future trains, an engineer declared at the annual Indiana Coal Conference in Terre Haute.

Dr. John T. Rettaliata, dean of engineering at the Illinois Institute of Technology, termed the coal-burning gas turbine "the most serious competitor to the presently popular diesel locomotive." He added that the gas turbine will offer the "ultimate in locomotive design."

A 4,000-horsepower locomotive which will burn coal is now nearing the test stage. It is expected to have lower fuel and maintenance costs than any other locomotive in history, Dr. Rettaliata said.

In the gas turbine, direct current type of electric transmission can be used, as is done in the diesel-electric type. But pulverized coal is burned in the combustion chamber to produce the gas which drives the turbine. The power plant includes a turbine which drives a compressor, and through a reduction gear, the generator.

By using a large amount of excess air, a clear stack free from smoke results, the engineer explained. This is important in meeting the requirements of present city ordinances, he pointed out.

Fuel costs of the coal-burning gas turbine locomotive are estimated at half those of a diesel, while lubrication costs will be as little as one-tenth, Dr. Rettaliata said.

Using coal as the fuel offers other advantages than economy, too, he suggested. Coal reserves are expected to last about 3,000 years, while oil reserves may last only 15 years, Dr. Rettaliata estimated. And the use of coal would help customer relations for railroads which get much of their revenue from hauling coal.

Science News Letter, October 9, 1948

PLANT PHYSIOLOGY

Radioactive Carbon Shows Cane-Sugar Formation

➤ RADIOACTIVE CARBON from Oak Ridge was used in producing definite proof that green leaves can add together the two simple sugars, glucose and fructose, to form cane sugar or sucrose, by Dr. Constance Hartt, research plant physiologist of the Hawaiian Sugar Planters' Association.

It had long been known that if cut leaves are placed in glucose-fructose solution in the dark, there is an increase in the amount of cane sugar they contain. However, until now it had not been conclusively demonstrated that the simple sugars actually entered the leaves and became changed into cane sugar.

Dr. Hartt first made radioactive glucose and fructose by "feeding" radioactive carbon dioxide to sugarcane leaves in the sunlight, and then chemically converting the sugar thus produced into the form needed for the experiment. Then these radioactive sugars were supplied in solution to other cane leaves in darkness, with all exchanges of material checked by minutely accurate quantitative methods.

The new cane sugar formed in the leaves was radioactive. Since the only possible source of radioactivity under the conditions of the experiment was the glucose-fructose solution, it proved definitely that the new cane sugar came from the two simpler sugars. Moreover, the total radioactivity of the cane sugar was very close to the value calculated on the basis of the twin sugars in the solution.

Science News Letter, October 9, 1948

ENTOMOLOGY

Spiders Digest Prey Before Eating It

➤ SPIDERS DIGEST much of their prey before eating it, R. E. Snodgrass of the U. S. Department of Agriculture points out in a new Smithsonian Institution publication. They wet their food with a digestive juice from their stomachs. This digests the soft parts to a liquid, which the spiders then swallow. So powerful is the enzyme that small lizards and fish captured by big tropical spiders can be liquefied in as little as two or three hours.

The publication is devoted mainly to a study of the mouthparts of mites and ticks, which are zoological second cousins of the spiders. Like the spiders, these forms have nowhere near as well-developed mouthpart systems as their more progressive distant kinsmen, the insects. They are therefore also dependent on liquid diets. Some of them suck up such nourishment as they can find on decaying plant materials. Others, notably the ticks, have developed an ability to feed on the blood of larger creatures, and have thus become pests and even carriers of dangerous diseases.

Science News Letter, October 9, 1948

ASTRONOMY

Sun Is Hissing at Us

Solar static may cause streaking in television and interfere with high frequency radio reception. Giant "mirrors" will be used to explore the sun's outbursts.

By MARTHA G. MORROW

► THE SUN is hissing at us in a high-pitched voice. And we on earth are just beginning to listen to find out why—and how.

The sun is constantly radiating vast amounts of energy of one sort or another. Light and heat are those with which we are most familiar.

As we use higher and higher frequencies in our scramble for radio space, energy reaching the earth in the radio frequency bands becomes of increasing importance.

Solar noise, which interferes with radio reception at ultra-high frequencies, is a steady hiss. Upon this are often superimposed "puffs" and "swishes" lasting but a second or less. When the swishes overlap, a grinding noise results.

Solar static comes to us on the same frequencies as those used for FM, television and radar.

In a television set, solar static may cause streaking on the screen and picture jumpiness. Intense bursts of solar energy that last for several hours cause a radar set to go blind when pointed in the direction of the sun.

But someday this very static may be harnessed to serve us. If we learn how to predict intense bursts of solar static, in wartime air raids may be scheduled for those days when the enemy's radar will be least effective. For peacetime, radio sextants may be developed so that solar static indicates the position of a plane or ship. Such a device would be effective, rain or shine, and be completely independent of ground stations.

Waves of Energy

Solar static does not reach the earth as noise that you can hear, but as electromagnetic energy. The waves can be turned into sound or used to draw lines on a chart.

Giant "mirrors" 10 to 25 feet across are being installed to explore outbursts from the sun. Some are solid metal, others are of wire screening.

Two of these enormous mushrooms have been set up at the National Bureau of Standards' radio propagation laboratory at Sterling, Va. Originally Giant Wurzburgs, a type of radar used by the Germans, these instruments have been converted to record solar noise. Brought back to this country by the Army Signal Corps, their steel mesh mirrors are 25 feet across.

A small antenna in the center of the basket-shaped mirror receives solar static,

which is carried by cable to the electronic equipment in an adjoining building. One saucer is already at work on the 480 to 500 megacycle band; the other has just begun to collect static.

With these instruments Grote Reber, in charge of the Bureau of Standards' project, hopes to discover:

1. Frequencies on which the solar noise is strongest.
2. If the static varies with the seasons.
3. Whether or not there is a long-term fluctuation.

At Cornell University, W. E. Gordon prefers to call his instrument a "radio telescope." Director of the Microwave Astronomy Project sponsored jointly by the university and the Office of Naval Research, he pictures the saucer-shaped radio antenna as the mirror of the telescope. Its wire surface collects radio waves an inch or so in length. A radio receiver replaces the usual eyepiece.

Follows the Sun

Designed to study static at several wave lengths, the instrument can follow the sun automatically in its daily rising and setting. An audible rather than a visible picture results. It will be used to study the relationship of solar static to sunspots.

Not screens, but solid metal disks are used at the Naval Research Laboratory at Anacostia, D. C., to collect the sun's radio waves. The two instruments, designed to record energy at wave lengths of ten centimeters or less, are each ten feet across and painted black to cut down the heat, which otherwise would be focused at the antenna.

Although solar static can be heard whenever earphones are plugged in, electronic devices are normally used to make the electromagnetic energy record its presence in the form of an inked line on a strip of paper.

Absorption of radio waves by oxygen and water vapor in our own atmosphere is one of the chief projects to be investigated by the Navy team headed by J. P. Hagan, with F. T. Haddock as his right-hand man.

Only within the past two decades have we on earth been aware of static coming out of the depths of the universe. Noises originating outside our planet were discovered in 1931 by K. G. Jansky of Bell Telephone Laboratories. The hiss he detected came not from the sun, but from the Milky Way.

While studying the direction of arrival of thunderstorm static at Holmdel, N. J., he observed that a small residual static

remained even when there were no local or distant showers. This static Mr. Jansky traced to the heavens. The strongest signals came from the direction of the center of the Milky Way, in the constellation of Sagittarius, the archer.

Noise originating in the Milky Way can be detected by the same equipment as that designed to study static from the sun.

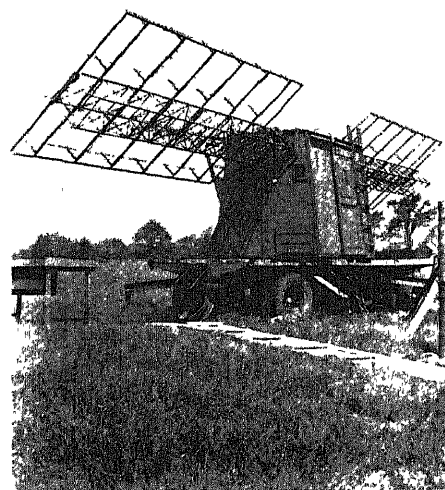
Two radio enthusiasts helped attract attention to the cosmic hisses a decade or so ago. Radio waves in the microwave region were studied by Dr. G. C. Southworth of the Bell Telephone Laboratories; those of meter wave lengths were investigated by Mr. Reber, whose hobby kept him up many nights.

Microwave Radiometer

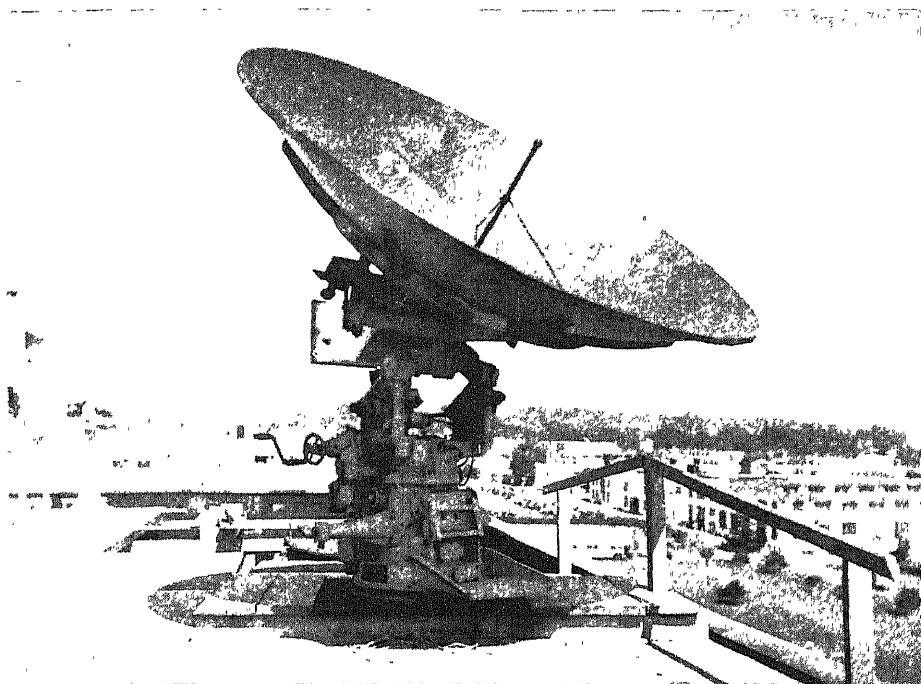
The study of solar noise at ultra-high frequencies was greatly aided about three years ago by a microwave radiometer developed by R. H. Dicke, then at the Radiation Laboratory, Massachusetts Institute of Technology. His device pretty much eliminates static originating in the instrument itself and makes possible more accurate measurements of the effective temperature of the sun and stars.

Much exact data on the sun has been collected during the last few years by A. E. Covington of the National Research Council at Ottawa, Canada. He has been chiefly interested in energy radiated from the sun at 10 centimeters wave length.

J. F. Dennis, of the Laboratoire de l'Ecole Normale Supérieure of Paris and



STUDY SUN'S RAYS—The newly completed radio telescope at Cornell University is the only such apparatus on a college campus.



CATCHES SUN'S HISSES—This solid metal disk is used at the Naval Research Laboratory to collect the sun's radio waves.

guest worker at the National Bureau of Standards, found from Mr. Covington's records a marked correlation between radiations received at 10 centimeter wave length and solar activity.

In the visible region, spots appear much darker than the rest of the sun because they are radiating less energy. But at 10 centimeters, Mr. Dennis finds sunspots radiate great amounts of radio energy and thus are many times "brighter" than the rest of the sun.

His analysis shows that the solar radio energy is proportional to the size and number of visible spots, and to the magnetic field of the individual spots.

In Australia, J. L. Pawsey of the Council of Scientific and Industrial Research used an ingenious interference technique to show by direct measurements that radio waves actually come from sunspots. Normally, not just one section of the sun's disk, but all of the energy radiated by the whole disk is studied. In England also, M. Ryle and D. D. Vonberg of the Cavendish Laboratory, Cambridge, have been concentrating on energy radiated by the spots.

The sun explored by radio waves is slightly larger than that seen visually. We see energy originating in the bright photosphere; we hear waves coming from the sun's outer surface or corona. Thus science has a new tool for estimating the temperature of various layers of the sun. And radio waves show a much hotter solar atmosphere than its fiery disk indicates.

At centimeter wave lengths, the sun appears to have a bright limb and dark center. During the recent total eclipse, as

much as four percent of the sun's energy continued to reach the earth during totality.

Sunspots sometimes can be found by radio a day or so before they are carried far enough around the sun's edge to be seen visually.

Thus we are beginning to learn much about the sun, source of our heat, light and other energy. Hisses from the sun are attracting the attention of an ever-increasing number of radio engineers, astronomers and others anxious to use this new means of exploring our nearest star.

Today men listen to the static from the sun, and attempt to discover what the noises mean. Instruments and brains are at work—many more will soon be pressed into service in the United States and throughout the world.

Science News Letter, October 9, 1948

ANTHROPOLOGY

Upper Right Leg Bone Is New Man-Ape Clue

➤ AN UPPER RIGHT leg bone found in South Africa is the latest link in the evidence showing that the man-ape, a creature higher than the modern apes and lower than the most primitive man, walked erect on its hind feet.

The bone was brought back by Dr. Frank Peabody, of the University of California's African Expedition.

The man-ape, which was first discovered by Dr. Robert Broom of the Transvaal Museum in South Africa, had a larger brain capacity than modern apes and an almost

human pelvis. There is a possibility, Dr. Peabody said, that the man-ape was contemporary with the early forms of man and that it may have lived as late as the early ice age. The ice age which was tens of thousands of years ago is still comparatively recent in terms of the age of life on the earth.

Although Dr. Broom reported that the man-ape could use its hands for the manipulation of tools and weapons, Dr. Peabody found no evidence that he used implements or fire.

Three tons of fossils were shipped to the University of California by the expedition. An analysis of the animal fossils may

WHITHER AMERICAN SCIENTISTS?

Will they keep on knuckling under to the military . . . the "loyalty" boards . . . the Un-Amer. Activities Committee . . . the whole war-ward hysteria?

The scientists' problem of patriotism in the atomic age—can they be loyal to both science and the politicians running the state? . . . Must science remain "the drab and slut of capitalism" (Vernon Parrington)?

What's happened to the atomic scientists' 1946 upsurge of responsibility to civilization?

CARL DREHER, engineer and writer, probes these and related questions in the central feature in the latest pamphlet of Louis Adamic's "Trends & Tides" (T&T) Series. Just Out.

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Do You Know?

Some 5,000 Australian *orchids* are now being sent weekly to the United States.

Wool is a cool-country commodity in both production and use.

Storage batteries and electrical cable coverings consume about half the *lead* used in the United States.

Experiments to obtain *rayon* from eucalyptus gum fiber are under way in Australia.

The *virus* of foot-and-mouth disease, so destructive to cattle, very rarely affects human beings.

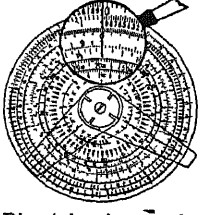
Chipmunks living on the Mammoth Hot Springs Terraces in Yellowstone Park drink hot water from the springs and seem to like the hottest water best.

American *railroads* operate a "navy" consisting of some 2,000 units; they are largely ferries, tugboats, car floats, barges and lighters used in harbor and ferry operations.

Sweet potato contains a rich store of carotene which gives it the yellow color but changes in the body to vitamin A; it also contains vitamins B and C, and starch and sugar which furnish high energy or fuel value.

The use of *lithium* has greatly increased, partly as a result of wartime developments; in the form of metal, salts or alloys, it is used in pyrotechnics, welding and ceramics, as a grease for airplane engines, and in removing oxygen from heat-treating furnaces.

A commercial product known as *Lignosite* is made by a refinement of ethyl alcohol produced by fermentation of the waste liquor in wood pulp mills; it is nearly pure calcium lignin sulfonate and is valuable in the cement and adhesive industries.



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lead to the determination of the times when these animals lived. Fossil plants also will help in determining the periods when various plants and animals flourished in South Africa.

A large collection of fossils from Karroo,

near the southern tip of Africa, where there are rich deposits of certain periods, contains mammal-like reptiles which bridge the gap between reptiles and mammals in evolution.

Science News Letter, October 9, 1948

GENERAL SCIENCE

Mental Battle for Peace

➤ A MENTAL BATTLE for world peace was fought in Boston, as leaders in education, science and culture opened sessions with one eye on Paris and the other on their plans for defending peace in the minds of men.

Assistant Secretary of State George W. Allen, opening UNESCO National Commission sessions, challenged American scientists to find any middle ground between subjection of scientific beliefs to the dictates of political dogma, as in Soviet Russia, and the traditional freedom of science. He similarly asked world churchmen where is the middle ground between East and West on freedom of religion.

Denounce one-party dictatorship in Russia, Secretary Allen demanded of Progressive Party candidate Wallace, by inference.

Told by Secretary Allen that "It is entirely possible for capitalism and com-

munism to exist in the world side by side," but that democracy and totalitarianism cannot do so, the conference turned to such details as reconstruction of devastated laboratories and colleges, teaching everybody to read and write, and keeping world news for press and radio free and uncensored.

President Milton S. Eisenhower of Kansas State College, speaking as chairman of the U. S. UNESCO Commission of One Hundred, said this group must be a militant organizing force for peace, despite gloomy prospects at Paris.

At the meeting scientists heard proposals for international observatories and laboratories, better exchange of information, more interchange of scientists between various nations, and greater attention to conservation and increase of world food supplies for the growing world population.

Science News Letter, October 9, 1948

MEDICINE

Don't Burp the Baby

➤ DON'T "BURP" the baby. This advice, contrary to that in all the baby books, was given by Dr. William F. Burdick, associate professor of pediatrics at Georgetown University School of Medicine, at the meeting in Washington of the Medical Society of the District of Columbia.

Twins who at two and one-half months started vomiting most and sometimes all of their feedings were cited as an example of the trouble burping can cause. Their mother reported she never put the babies down until they got up their "bubbles," even though it sometimes took 15 minutes. When she was persuaded to let them suck without interruption until they seemed satisfied and then to put them down without burping, their vomiting stopped.

If baby shows discomfort, there may be some value to the burping procedure, Dr. Burdick said, but he thinks it is often carried too far. It takes a reversal of the normal peristaltic movement of the digestive tract to achieve a burp, he pointed out. The same reversal occurs in vomiting. This may explain the vomiting of some babies. Or, he suggested, they may vomit from resentment over being forced to burp.

Put the newborn baby's cheek against his mother's breast the first time he is brought in to nurse. This, Dr. Burdick advised, will

avoid some feeding troubles. It will let the baby's "rooting" reflex come into play. Feeling the smooth surface, he will start rooting with his mouth for the nipple. Dr. Burdick criticized the practice of nurses who grasp baby's cheek and try to turn his head toward the nipple. The reflex in this case makes the baby turn toward the nurse's palm instead of the breast.

Science News Letter, October 9, 1948

RADIO

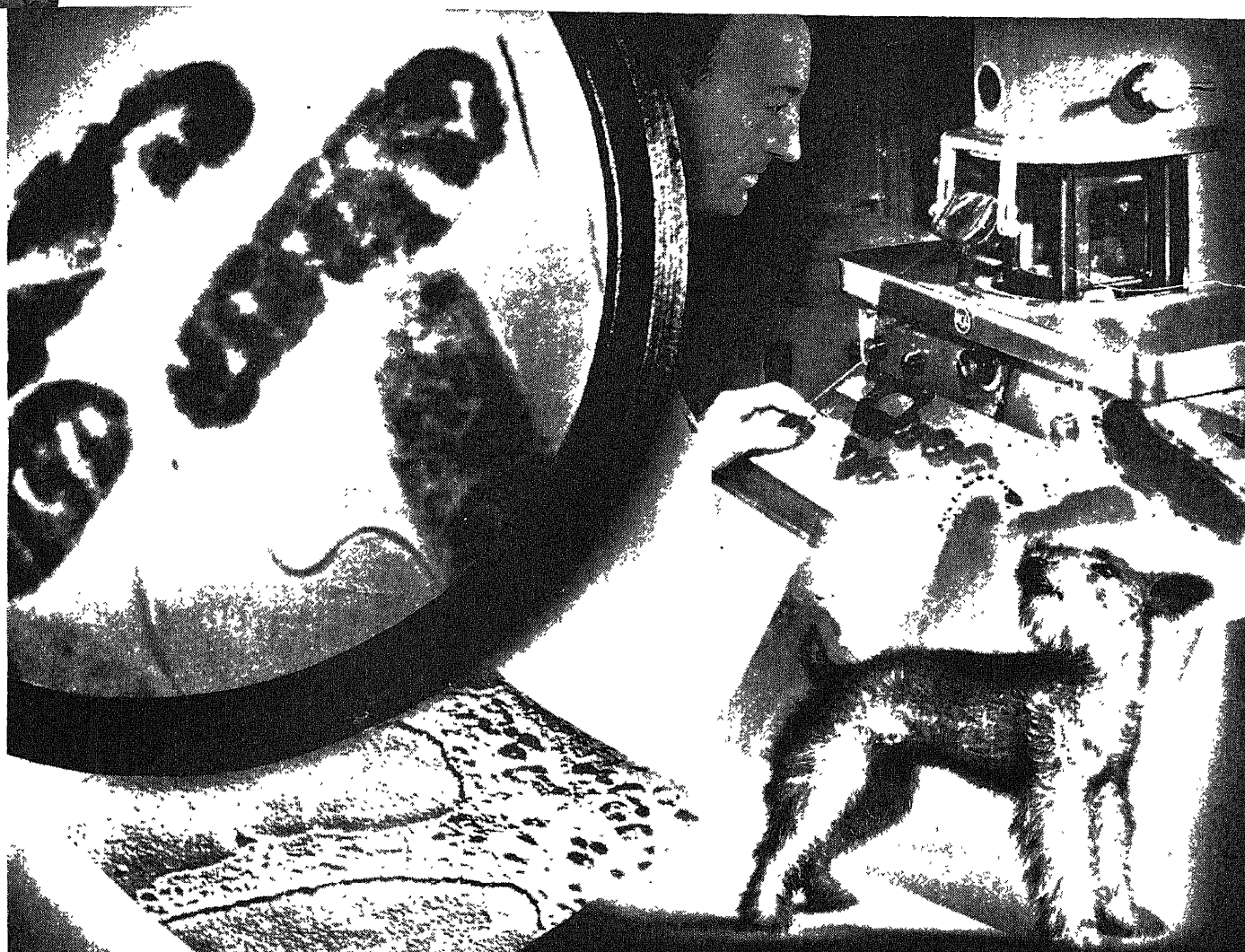
New Device Checks Up on Radio Station Frequency

➤ A NEW DEVICE that can detect a difference of five electrical impulses in a million has been developed to reveal when a radio station is broadcasting off its assigned frequency.

Developed by General Electric Company engineers, the new AM station monitor uses a new type of electronic circuit. The monitor checks up on amplitude of broadcast waves and the power being transmitted, as well as measuring frequency.

About the size of an egg crate, the monitor is relatively small for such equipment.

Science News Letter, October 9, 1948



Electron microscope, perfected at RCA Laboratories, reveals hitherto hidden facts about the structure of bacteria.

Bacteria bigger than a Terrier

Once scientists, exploring the invisible, worked relatively "blind." Few microscopes magnified more than 1500 diameters. Many bacteria, and almost all viruses, remained invisible.

Then RCA scientists opened new windows into a hidden world—with the first commercially practical electron microscope. In the laboratory this instrument has reached magnifications of 200,000 diameters and over. 100,000 is commonplace . . .

To understand such figures, pic-

ture this: A man magnified 200,000 times could lie with his head in Washington, D. C., and his feet in New York. . . . A hair similarly magnified would appear as large as the Washington monument.

Scientists not only see bacteria, but also viruses—and have even photographed a molecule! Specialists in other fields—such as industry, mining, agriculture, forestry—have learned unsuspected truths about natural resources.

Development of the electron

microscope as a practical tool of science, medicine, and industry is another example of RCA research at work. This leadership is part of all instruments bearing the names RCA, and RCA Victor.

. . .

When in Radio City, New York, you are cordially invited to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. Radio Corporation of America, RCA Building, Radio City, New York 20.



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ASTROPHYSICS

Sun's Rays Harm Cloth

➤ LIGHT RAYS of short wavelength damage cotton textiles much more drastically when these rays alone strike the fabric than when mixed with the other light-rays from the sun.

This observation of the effect on cotton sheeting of a narrow band in the blue end of the sun's spectrum was made by P. J. Fynn, J. E. Sands and K. S. Campbell of the U. S. Department of Agriculture's Southern Regional Research Laboratory.

While all sections of the sun's spectrum tend to damage the cloth, the energy from the ultraviolet and blue spectral regions has by far the most drastic action. The damaging effect is reduced, however, when these light rays are mixed with those from the yellow and red sections of the spectrum, they report in the *TEXTILE RESEARCH JOURNAL* (June).

Filters transmitting predominantly ultraviolet, blue, yellow, red and infrared light were used for the study as well as a sixth glass that let through all rays reaching the earth at sea level.

Samples from the same piece of kier-boiled cotton sheeting were exposed simultaneously. Some were placed in a specially constructed cabinet designed to eliminate in so far as is possible all factors other than sunlight that might harm the textile. The cabinet was adjusted so that during exposure the samples were always perpendicular to the sun's rays.

Other pieces of cotton sheeting were placed in open racks, some receiving the full rays of the sun, others protected by filters but open to free air circulation. Some faced north, some south, some directly upward.

A comparison of samples from controlled and uncontrolled exposures indicated that, in the absence of damage due to microbes or acid atmosphere, sunlight could account for practically all the damage caused by exposure to the elements. The damage was greater when the samples were always perpendicular to the sun.

Radiant energy from some parts of the

sun's spectrum obviously damaged the material more than others. Light rays of short wavelength caused the most trouble. But the degrading influence of solar radiation is not limited to the short wavelength portion of the spectrum, the scientists found. In eight months at least one-fifth of the fabric's strength was lost through exposure to the longer wavelengths of energy as transmitted by the yellow and red filters.

Science News Letter, October 9, 1948

ENTOMOLOGY

Germ-Carrying Mosquitoes Found on Wake Island

➤ DISEASE-CARRYING mosquitoes, hitherto unknown on mid-Pacific Wake island, have been found there since the war, reports Dr. W. C. Reeves of the University of California School of Public Health.

The Jap invaders, who captured the island early in the war in the face of epic resistance by the small Marine garrison, are apparently responsible for the presence of one species, *Aedes aegypti*, familiar as the carrier of yellow fever. Another species of the same genus, *Aedes albopictus*, has also been found; its mode of reaching the island is uncertain.

Both these species are capable of carrying another disease, dengue fever, which is considered more of a practical menace in the Pacific islands than is yellow fever.

Along with the second *Aedes* species was found a malaria carrier, *Anopheles subpictus*, which seems to have come from the Philippines; though this has not yet been certainly proved.

Dr. Reeves believes that at least one of the species, *Aedes aegypti*, can be eradicated from Wake, since its breeding habits make it largely dependent on cisterns, barrels and other man-provided supplies of water. Because of the island's importance in trans-Pacific air traffic he feels that such a drive should be undertaken.

Science News Letter, October 9, 1948

ORNITHOLOGY

Robins in Arctic Alaska Have 21-Hour Working Day

➤ ROBINS in arctic Alaska work as many as 21 hours a day during nesting season. This almost sleepless activity was reported by Martin Karplus, science student at Harvard University, who spent the past summer in the region of Point Barrow, on a Navy-sponsored study of bird migration.

When some of the birds they were supposed to be watching failed to turn up, Mr. Karplus and his chief, Dr. Donald R. Griffin, spent part of their time closely observing the work of a pair of robins at

a spot about a hundred miles southeast of Point Barrow, which is the "farthest north" for the species. They had their nest in a willow about five feet high—which is a giant tree for that latitude.

All day and almost all of the midnight-sunned night the parent birds toiled, bringing food for the always-gaping mouths of their young. Only around midnight did they catch a little sleep, under the still-bright sky. Then they were at it again.

The young robins showed the effects of the abundant feeding they received. They grew very rapidly, and were ready to attempt their first short flights in ten days, instead of the two weeks or so required in these lower latitudes.

Mr. Karplus was chosen for last summer's research task while he was still a freshman at Harvard, because he has already done ornithological work of professional grade. Even as a "teen-age winner of a Westinghouse Science Scholarship in the 1947 Science Talent Search he turned in a study of bird migrations rated as fully mature. The Science Talent Search is conducted by Science Clubs of America, administered by Science Service.

Science News Letter, October 9, 1948

CHEMISTRY

Mildew-Checking Chemical Locked into Linens

➤ MILDEW-PREVENTING chemicals may be effectively locked into linens by modification of an old method for fireproofing textiles. Three hundred pounds of laundry can now be treated for a few cents, and the life of the fabric greatly prolonged.

The process was developed by Monsanto Chemical Company working in cooperation with Morgan Linen Service Company in St. Louis. It can easily be adapted to normal commercial laundry washing procedures.

A concentrated solution of sodium pentachlorophenate, a water-soluble fungicide, is basis of the treatment. The treating bath is prepared by adding eight ounces of an approximately 30% solution of the chemical to about 40 gallons of water in a standard wood washer. Clothes to be treated are rinsed in this solution for five minutes.

Science News Letter, October 9, 1948

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Books of the Week

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ANA PUBLIC RELATIONS WORKSHOP: A Manual of Practical Public Relations Techniques Prepared for the Guidance of the National Membership of the American Nurses' Association—*American Nurses' Association*, 32 p., illus., \$2.50. Of interest to anyone who is trying to let the community know about a "cause."

THE CLINICAL APPLICATION OF PSYCHOLOGICAL TESTS: Diagnostic Summaries and Case Studies—Roy Schafer—*International Universities*, 346 p., \$6.75. A book for psychologists, psychiatrists and social workers showing how tests can be useful in diagnosing mental ills. This is because a man's characteristic way of thinking depends on the personality that underlies it.

A COLLECTION OF TREE SPECIMENS FROM WESTERN ECUADOR—Elbert L. Little, Jr.—*U. S. Department of Agriculture*, 83 p., illus., paper, free on request to the U. S. Dept. of Agriculture. A special issue of "The Caribbean Forester." Ecuador, the article states, is botanically one of the least known countries in South America.

FACTORS AFFECTING THE TECHNICAL HARDNESS OF MAGNESIUM—Louis A. Carapella and William E. Shaw—*Light Metal Age*, 4 p., illus., paper, free on request to Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa.

FOREST PLANTING IN THE CARIBBEAN NATIONAL FOREST: PAST EXPERIENCE AS A GUIDE FOR THE FUTURE—Jose Mattero—*U. S. Department of Agriculture*, 128 p., illus., paper, free from U. S. Dept. of Agriculture. A special number of the magazine, "The Caribbean Forester." In both English and Spanish.

HEALTH TEACHING IN SCHOOLS: For Teachers in Elementary and Secondary Schools—Ruth E. Grout—*Saunders*, 320 p., illus., \$4.00. Furnishing not only the principles of health education but also materials for use in class.

HOW TO CONQUER YOUR HANDICAPS—Marie Beynon Ray—*Bobbs-Merrill*, 336 p., \$3.00. Directed to the person who has some variety of handicap (and who doesn't) and intended to show how it can be turned into an asset.

HOW TO DRAW TECHNICAL ILLUSTRATIONS—Linsley and Hawkins—*Studio*, 64 p., illus., \$1.00. Technical illustration is somewhere between mechanical drawing and "art." It is a skill most useful to the scientist.

POLIO AND ITS PROBLEMS—Roland H. Berg—*Lippincott*, 174 p., illus., \$3.00. The story, in non-technical language, of what is being done and has been done to fight this disease.

THE ROCKEFELLER FOUNDATION ANNUAL REPORT 1947—*Rockefeller Foundation*, 374 p., illus., paper, free upon request to Rockefeller Foundation, 49 West 49 Street, New York. An account of a wide variety of researches.

THE STORY OF THE JOHNS HOPKINS: Four Great Doctors and the Medical School They Created—Bertram M. Bernheim—*McGraw-Hill*, 235 p., illus., \$3.50. Reminiscences of four great men, the history of a famous medical school and an account of great moments in medical

history all in one interesting book.

THE STUFF WE'RE MADE OF—W. O. Kermack and P. Eggleton—*Longmans*, 2d ed., 356 p., illus., \$3.00. Two new chapters on vitamins and other growth factors have been added to this interesting book on biochemistry.

THIRD REPORT TO CONGRESS ON THE UNITED STATES FOREIGN RELIEF PROGRAM: For the Quarter Ended March 31, 1948—Department of State—*Govt. Printing Office*, 104 p., illus., paper, 30 cents. How the Government spent \$299,000,000 in five countries devastated by war.

UNDERSTANDING TELEVISION: What It Is and How It Works—Orrin E. Dunlap, Jr.—*Greenberg*, 128 p., illus., \$2.50. A book for laymen explaining how you see at a distance.

VIRAL AND RICKETTSIAL INFECTIONS OF MAN—Thomas M. Rivers—*Lippincott*, 587 p., illus., \$5.00. An authoritative work for medical students and physicians priced low because its publication was aided by the National Foundation for Infantile Paralysis.

Science News Letter, October 9, 1948

WILDLIFE

Bird's Ten-Minute Meal Costs State Fish, and \$8.10

➤ A HUNGRY LOON has cost the state of New Hampshire \$8.10 for one ten-minute meal.

The story of the greedy loon is told by the disappointed conservationist who saved the loon's life so that the bird could enjoy its brief but expensive feast.

Hilbert R. Siegler of the New Hampshire Fish and Game Department explained in the *JOURNAL OF WILDLIFE MANAGEMENT* that he was with a group of department members on a hunting trip. The party was at Second Connecticut Lake in northern New Hampshire.

The loon was found feeding near the group's cabin. Several of the party urged shooting the bird because it was near trout and salmon waters. But Mr. Siegler says he intervened and prevented the bird from being shot for three days.

On the fourth day a truck arrived with two-year-old salmon to be planted in the lake. While the fish were being put in the lake, the loon suddenly appeared. Ten minutes later, the loon was shot.

In its gullet were nine salmon. Cost of raising these fish is estimated at 90 cents apiece.

"In approximately ten minutes of feeding," Mr. Siegler laments, "this loon had cost the State \$8.10, eliminated nine of New Hampshire's sportiest and most highly prized fish, and given my efforts at wildlife conservation a severe set-back."

But Mr. Siegler has no hard feelings about loons. He points out that the hatch-

ery-raised fish were highly concentrated and pretty tempting to the bird.

Science News Letter, October 9, 1948

NUTRITION

Hamburger Most Popular, Says Hotel Food Expert

➤ HAMBURGER STEAK is the most popular American dish.

More people eating in restaurants, cafeterias and soda fountains today will be ordering hamburgers than will be choosing any other kind of food, Arthur W. Dana, kitchen consultant for the American Hotel Association, declared. Mr. Dana taught at a summer course in the Hotel Administration School at Cornell University.

Milk is becoming more popular, he added. At least half of the diners in industrial cafeterias will choose it instead of coffee.

Restaurant patrons apparently eat more when the price they pay includes the entire meal than when it includes only the entree and vegetables. If dessert and appetizer are extra, about 60% will take dessert. Only 20% to 30% will take an appetizer if they have to pay separately for it.

Tastes differ widely in the matter of cooked vegetables, Mr. Dana explained. Southerners want their vegetables well cooked and boiled with fat meat; northerners would rather have theirs cooked quickly with butter added when the vegetable is done. The northerners' attitude agrees with the teachings of nutritionists who say that quickly cooked vegetables contain more vitamins and minerals.

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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 435. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **CORN CUTTER**, a newly patented kitchen tool to remove cooked sweet corn from the ear, has a handle, and an ordinary rigid cutting blade for paring which extends into two semi-flexible, semi-circular blades to fit around the ear of corn. The flexibility of these overlapping circular blades permits them to adjust themselves to the size of the ear.

Science News Letter, October 9, 1948

⚙️ **MAGNIFIER-ILLUMINATOR**, which combines in one instrument means for lighting and enlarging objects for visual examination, utilizes three six-watt, nine-inch fluorescent tubes and a high-grade five-inch lens which brings objects into sharp focus at 13 inches. It can be clamped into any desired position.

Science News Letter, October 9, 1948

⚙️ **HIGH POWER MAGNETRON tube**, with a continuous wave output of 50,000 watts at the extremely high frequency of 1,000,000,000 cycles per second, has an output estimated roughly at 1,000 times as high as that of a standard broadcasting station. Earlier magnetron tubes made the war-developed radar a success.

Science News Letter, October 9, 1948



⚙️ **RELIEF MAPS** of molded plastic, for use in studying geography and geology, are light in weight, extremely durable and can be readily stored or displayed, as is evident from the picture. In making, pre-printed vinylite sheets are placed over a plaster mold which in turn was made from an

aluminum sheet on which contour details had been formed.

Science News Letter, October 9, 1948

⚙️ **GLASS-SHIELDED**, single lamp fluorescent fixtures, which produce soft diffused illumination in places where bare lamp fixtures are unsuitable, include attractively ribbed, opaque glass diffusing panels and end caps with decorated medallions. They are suitable for home as well as commercial applications.

Science News Letter, October 9, 1948

⚙️ **INSERT SHELF** for the bathroom medicine cabinet is made of a colored plastic and holds on one end a man's shaving equipment in special slots, and on the other, where the shelf is edged, the toilet preparations which a woman wants to have handy. Extension arms with padded ends fix the shelf in place without the use of tools.

Science News Letter, October 9, 1948

⚙️ **MILK BOTTLE CAP** makes a utility dispenser out of a milk bottle. The plastic cap with a side handle fits any standard milk bottle, grabs one side of the bottle top with an elastic grip, and can be opened like any hinged lid by thumb pressure on the lower part of the handle.

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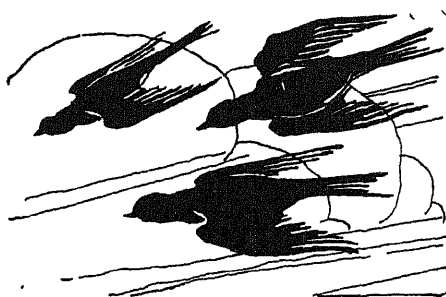
• Nature Ramblings by Frank Thone •

➤ **COLUMBUS'** landing on one of the smaller islands of the Bahamas, that opened up the Western Hemisphere to exploration and settlement, will be celebrated next week in many of our states and cities. Again the daring imagination, skilled seamanship and stubborn determination of the great navigator will receive their due meed of praise.

But Columbus had helpers, barely mentioned in most accounts of his famous first voyage. Their aid seemed slight even to him, yet it came at a critical time, and perhaps prevented failure or defeat just before the moment of final success. These helpers were small birds.

In Columbus' own account of the crucial last few weeks before land was sighted at daybreak of October 12, 1492, he makes mention of signs of land picked up by the sailors of his three little ships—a branch with berries, several pieces of hand-worked wood, birds flying overhead. The latter were of kinds that the Spaniards did not know, but it was quite evident that they

Columbus' Helpers



were not all sea-birds. Land must not be too far off. Mutterings of possible mutiny subsided, and all eyes strained anxiously towards the horizon, for the first sign of green that might rise above it.

Two things made possible the observation of those significant flocks of land birds. It was mid-autumn, and the migration of birds that nest on the North Ameri-

can mainland towards their winter homes in the West Indies and northern South America was at its height. Had the three caravels been a little faster or a little slower, they might have missed the high tide of the fall flight, and so encountered few birds, or none.

The second factor that made possible the sighting of the birds was Columbus' choice of course during this terminal part of the voyage. He was sailing westward close to the twenty-fourth parallel of longitude, which carried him straight to the island he subsequently named San Salvador. He did not know it, but he was all the time passing the larger islands of the West Indies, which lay well to the south. Since these islands were the destination of many of the birds he saw, he was actually intersecting their migration routes. Had he turned and followed the first flocks he saw, late in September, he probably would have made his landfall somewhat sooner, and on a larger island.

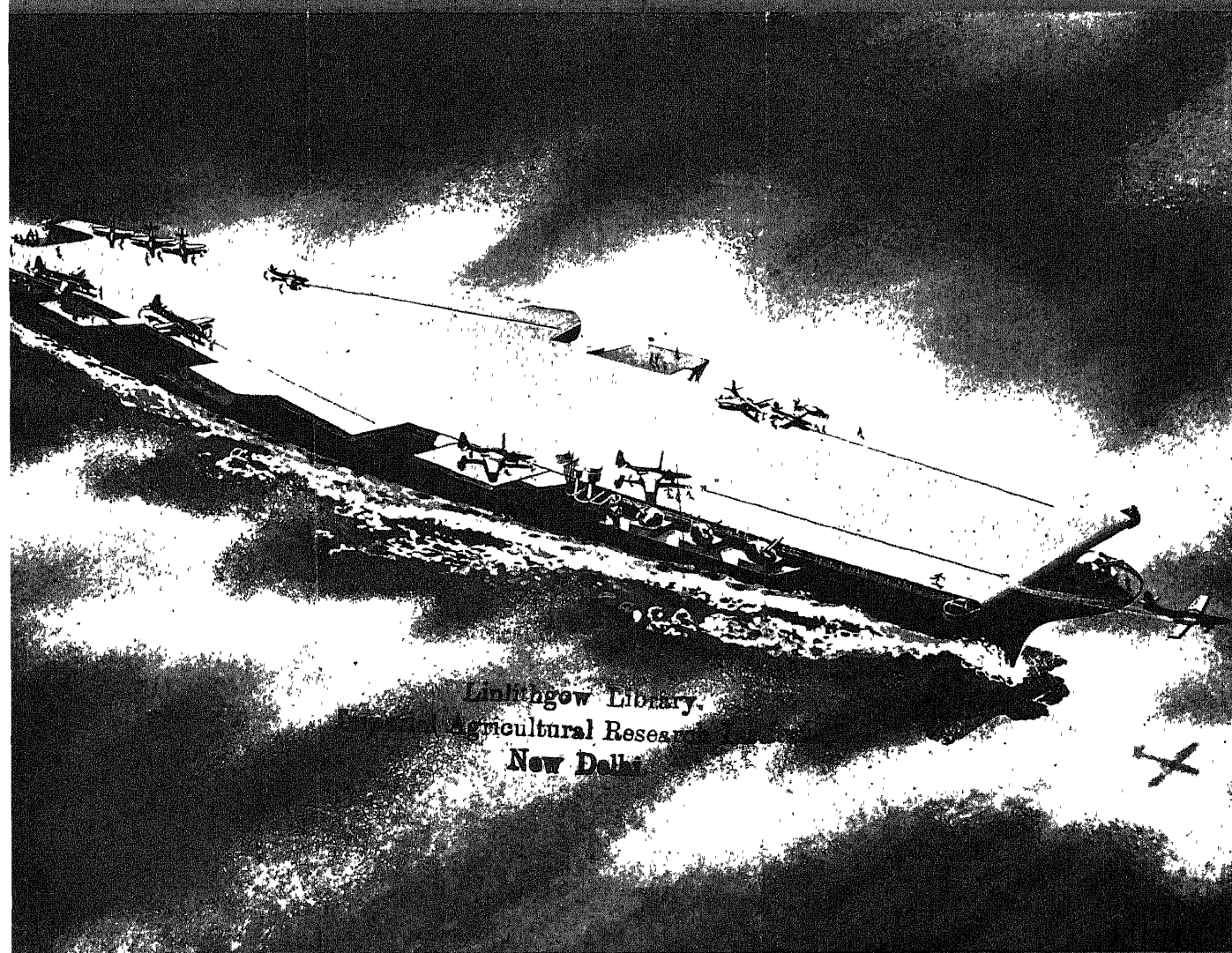
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13 DEC 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Lindlithgow Library.

Agricultural Research Station

New Delhi

Super Aircraft Carrier

See Page 242

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VOL. 54 NO. 16

ENGINEERING

Plan Giant New Carrier

Navy will soon begin construction of a 65,000-ton aircraft carrier that is expected to be "capable of operating an airplane of well over 100,000 pounds."

See Front Cover

► **WORLD'S LARGEST WARSHIP**, a 65,000-ton aircraft carrier, is scheduled for construction beginning within a few months, the Department of the Navy disclosed.

The super carrier will have a flush-deck design, without the familiar "island" superstructure above the large, flat flight deck. The Navy said that such a modern carrier was first proposed by the late Adm. Marc A. Mitscher, who won fame as the commander of carrier forces in the Pacific in World War II.

Keel for the vessel will be laid late this year or early in 1949 at the Newport News Shipbuilding and Dry Dock Corporation yards, Newport News, Va. Cost is estimated at \$124,000,000. It would "normally" require four years to build, it was stated, but the ship could be completed sooner with high priority.

Officials emphasized that the new giant carrier is a "normal development." It will be 1,030 feet long—actually 1,090 feet at its greatest length, including hull and flight deck. Present largest carriers are the Midway class, about 980 feet in length and listed as having a 45,000-ton displacement.

As yet unnamed, the planned new carrier is designated as the CVA-58.

This newest and largest carrier is expected to be "capable of operating an airplane of well over 100,000 pounds." Weight of the wartime B-29 bombers was listed as 120,000 pounds.

With larger planes, the ship will be protected by aircraft of much greater range than is now possible, it was emphasized.

Requirements for a carrier to operate such planes were listed as: deck strength for impacts as high as 500,000 pounds; stability for high topside weights; increased flight deck area; room for more supplies, fuel and munitions, plus additional personnel; greater armor and armament; and higher speed than previous carriers.

Speed of the CVA-58 is planned to be about 33 knots.

Bridges for commanding the ship will be below the flight deck and have telescopic facilities. Although World War II carriers had the island with flag and ship bridges above the flight deck in a structure on the starboard side of the ship, the new carrier will be the Navy's third experience with the flush-deck construction.

The historic U. S. S. Langley, the first carrier which was commissioned in 1922, had a flush deck. The U. S. S. Ranger was

designed in 1934 to have a flush deck, but an island was added for navigational and fire-control purposes.

In addition to providing more space for plane operations, the flush deck will make the ship less easily detected by an enemy, it was indicated.

Four catapults for launching planes are

BIOCHEMISTRY

Body Converts Poison Gas

► **POISONOUS** carbon monoxide, popularly known as garage gas, can be converted into harmless carbon dioxide in the living body. Evidence for this, obtained in part from experiments with radioactive carbon from the atomic pile, was reported by Dr. Wallace O. Fenn of the University of Rochester at the dedication of the Detroit Institute of Cancer Research Laboratories.

Certain bacteria have been known to live on the energy obtained from the burning of carbon monoxide to carbon dioxide in their bodies. But, as Dr. Fenn put it, "it is news that we ourselves may to some extent share these metabolic potentialities with the bacteria."

On the practical side, he doubts whether the reaction would ever do us any good. The amount of burning is too small, he said, to be of any practical importance in, for example, cases of carbon monoxide poisoning. There is always the possibility, however, that these findings, which are contrary to previous scientific belief, may contribute to the solution of some other problem.

Dr. Fenn's report is, as he pointed out, an "I told you so" sequel to a scientific paper he published 16 years ago. In that paper he gave evidence that carbon monoxide was burned to carbon dioxide in certain frog tissues. Other scientists were frankly skeptical. Recent attempts in California to confirm the finding with experiments on man using radioactive carbon were unsuccessful.

"Now," Dr. Fenn reported, "thanks chiefly to the work of one of our graduate students, Prof. Robert C. Clark of Abilene Christian College in Texas, I am able to report that frogs and mice confined in a closed space containing carbon monoxide gradually use up small but measurable quantities of this gas. And further that isolated tissues (muscle kept alive outside the animal's body) exposed to 80% carbon monoxide containing the radioactive carbon

included in plans for the CVA-58. In addition to the two catapults at the bow, as on existing carriers, there are to be another pair, one on each side.

The size of the new ship, which will have a waterline beam of 130 feet and a maximum fixed width of 190 feet above the waterline, will make it another of a group of the Navy's largest ships that can not pass through the Panama Canal.

Design studies for the new carrier have been under way since October, 1945, the Navy revealed. Present plans were accepted after some 78 different designs had been made.

The picture on the cover of this week's SCIENCE NEWS LETTER is an artist's conception of the carrier.

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14 produce carbon dioxide containing approximately the amount of radioactive carbon that was predicted from the earlier experiments.

"It seems definite therefore that carbon monoxide is burned to carbon dioxide in living tissues in small amounts."

Since carbon monoxide is, so far as known, never produced in the normal chemical processes of living cells, the tissues apparently never "knew" they could burn the gas until the experimenter tried the test. And, contrary to what might be expected, muscles do not increase their rate of burning of the gas after "practice." After 17 days and in half a dozen individual frogs living in atmospheres containing sublethal concentrations of carbon monoxide, the muscles had "completely forgotten how to burn the carbon monoxide," Dr. Fenn reported.

These experiments which revealed the muscle forgetfulness were conducted in his laboratory by Dr. Tulio Velasquez of Peru who was hoping to gain new knowledge of muscle chemistry in relation to exposure to high altitudes.

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WILDLIFE

"Cost of Living" Raise Proposed for the Ducks

► A "COST OF LIVING" pay increase for ducks is being urged.

It would be in the form of a 20% boost in the cost to hunters of killing ducks. The National Resources Council of America, meeting in New York, went on record as favoring a jump from one to three dollars in the price of duck stamps. Some members of the conservation group urged an even greater fee increase.

Proceeds from the sale of the stamps are used to pay the costs of saving and increasing duck populations.

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Central Agricultural Research Institute
New Delhi.

MEDICINE

Flies Spread Diarrhea

Scientific proof is now available that flies are involved in the spread of diarrheal diseases which often kill young children.

► SCIENTIFIC crime detection methods have now convicted a criminal suspected for years but never before brought up against convincing evidence of his crime. The criminal is the fly. The crime is the spread of diarrheal diseases that yearly attack babies, small children and even grown-ups, often killing the younger victims.

The heroes of the story, though they probably won't like being cast in that role, are Dr. James Watt and Scientist Dale R. Lindsay of the U. S. Public Health Service.

For two years these men have carried on their hunt for evidence to convict the fly of spreading diarrheal diseases. Modern insecticides, such as DDT, have been their chief weapons. Hidalgo County, Texas, was the scene of their activities. It was selected because it has always had a large amount of infectious diarrheal diseases as well as a major fly problem.

Towns in the county were divided into two comparable areas. One set of towns was sprayed every six weeks with DDT and periodic counts of the fly population were taken. When material increase of flies was noted, spot re-treatments were made,

sometimes as often as twice weekly.

The other set of towns was left untreated. Children in both sets of towns were studied by laboratory analyses of cultures. Family histories were taken and an analysis was made of deaths reported resulting from diarrheal diseases.

As the fly control measures progressed, a marked decrease was noted in cases of diarrheal diseases due to Shigella infection in the treated towns.

When treated and untreated towns were reversed, the treated ones being left to the mercy of fresh fly populations, and the previously untreated ones getting DDT sprayings, the number of cases of diarrhea in the towns soon became reversed. As fly populations increased, diarrhea increased, and the reverse.

Health authorities and private citizens who have fought flies on the theory that they spread diarrheal diseases now can be encouraged to renew their war on flies with scientific proof of the fly's criminal role.

Details of the study were reported in PUBLIC HEALTH REPORTS, official U. S. P. H. S. scientific publication.

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suitable radars for transport aircraft, the specifications of these radars being based upon the results of the flight testing program."

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ENGINEERING

Electron Beam Used for Study of Metal Surfaces

► A SCIENTIFIC instrument for the study of surface layers of metal less than a quarter-millionth of an inch thick may aid in the development of longer-wearing metals for aircraft engines and other products.

Known as an electron diffraction instrument, the device was built by the general engineering and consulting laboratory of the General Electric Company. A beam of electrons, the negatively charged bits of atoms, is shot through the thin sheet of metal. The image made by the electrons is captured on a fluorescent screen or photographic film for study. Surface conditions such as corrosion and crystal structure are revealed by the image from the beam.

Dr. J. G. Hutton predicted that the instrument will be important in metallurgical studies for electrical equipment and for research on a wide number of industrial products. The electron diffraction instruments are now in use in various laboratories.

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AERONAUTICS

Flying Safer with Radar

► AIRPLANES in the future will bring you more surely to port through storm or darkness because of new radar designs now being developed.

Radar paints a picture of the terrain over which your plane must fly, making it possible to travel through darkness or in overcast, Lt. Comdr. E. W. Harrison of the Navy's Bureau of Aeronautics stated in Washington at the joint meeting of the International Scientific Radio Union, American Section, and the Institute of Radio Engineers.

With radar a pilot can check wind velocity and direction without leaving the course. Even in unfamiliar terrain he can safely avoid mountains and peaks. To some degree radar will warn a pilot of another aircraft in the immediate vicinity, or of a thunderstorm or weather front.

Wartime sets have shown that for better performance a radar set must have:

1. Simple, readable indicator—this would present pictorial information so that a minimum of interpretation is required.

2. Switchable CSC²-pencil beam antenna

—with this either type of pattern can be selected by the pilot.

3. Stabilization of the antenna in roll—this lets the pilot bank the plane without losing the radar presentation.

4. Increased transmitter power and receiver sensitivity—this gives a greater range for beacons, land mapping and weather detection.

5. Quick-neutral stabilization position—this permits use of radar as an artificial horizon in the event of instrument failure.

6. Five microsecond pulse—this pulse is used specifically to detect weather.

These features are being incorporated in the AN/APS-42 radar, now being engineered for production.

"During the past two years the Navy, Air Force and commercial airlines have been flight testing two wartime radars to determine what features are needed for a transport radar and how such a radar can contribute to safety of flight," Comdr. Harrison said.

"At the same time Joint Air Force-Navy programs have been underway to produce



ELECTRONS AID IN METAL STUDY—Dr. J. G. Hutton is shown inserting a sample into the electron diffraction instrument which is used to study corrosion and crystal structure of metal in General Electric Company's laboratory.

PSYCHOLOGY

Neighbors Pick Leaders

➤ REGARDLESS of who is elected to the Presidency on Nov. 2, the real leadership of the country will not be in his hands.

The real leaders of the American democracy are a nameless group, without titles, without salaries, and often without even being aware that they are leaders. They are selected without ballots by the common consent of their neighbors who put faith in their foresight and judgment.

About one man out of 20 in your own community is such a leader. It is he, and not the political speaker, who determines how his neighbors vote, either locally or for President. It is he who swings sentiment toward or away from the new bond issue, or toward building a better school or raising the teacher's pay. This is true in the country. It is also true in the city.

This pattern of leadership characteristic of American democracy was revealed when the U. S. Department of Agriculture Soil Conservation Service attempted to inaugurate a program of soil conservation. What the soil conservationists discovered about leadership was done long before the present political campaign. The Government scientists are careful not to apply the results to politics.

Soil conservation is a strictly community undertaking. It does no good for one farmer to plow his acres on the contour, to eliminate gullies, or to plant trees and soil-holding grasses, if his next-door neighbor is going to let all the drainage from his land wash over the boundary and is going to permit overgrazing on his grassland.

And the way to get all the farmers to work together to plan and put into effect an adequate conservation program is not, it was found, for a Government man to go in and tell everybody what they must do.

There are certain molders of opinion in each community. There is the newspaper editor, the preacher or priest, the teacher, the banker or maybe a clubwoman. These are effective. But if you hope to enlist co-operation in an enterprise, you can't leave it to these people to carry it out for you. They influence thinking, but it is not they who produce action.

If you want community action on a program, the thing to do is to hunt up the real leaders and explain your project to them. This is done through an ecological study of the community, Dr. John P. Shea, U. S. D. A. psychologist, has found. The scientist first looks the community over to find out how the people live—their customs, occupations, economic life, religion, recreation, education.

In some places the school has an important role in affairs and much can be done to inform the community through it. But in another locality, the people do not "hold much with book larnin" and would consider it an indignity to be invited to a meeting in the schoolhouse.

It is easy to locate the molders of opinion in the community; you just ask any one of them and he can name for you practically all the others. But to locate the leaders of action, you must ask the followers.

It is the person who has the respect of his neighbors. He is usually a man of few words—he leads mainly through what he does. His neighbors watch him. When he takes his hogs to market, they know it is the most favorable time to sell. If he plants soy beans or wheat, the neighbors would not think of putting all their land into corn.

The natural leader in America is just a little above average in intelligence, but not

too different from his neighbors in this respect. He is always a man of courage, willing to try new things and take the initiative in making changes. He is a man of established soundness of judgment that other men can rely on. He is community-minded; he thinks of the welfare of his neighbors.

It takes a man about one third of a lifetime to establish leadership in a community, but it is then permanent and he usually maintains his position until death.

Without this man's nod of approval for an issue or a candidate, his followers will not budge.

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Aiding Young Scientists



► Boys and girls who like science want to join Science Clubs of America. One third of a million boys and girls already do belong to the 15,000 clubs affiliated with Science Clubs of America. Each club is sponsored by an adult who combines knowledge of science with a willingness to help young people.

Parents: you can help your son or daughter learn more about science.

Educators: you can give your students the benefit of national and state affiliation with thousands of other young scientists.

There is no charge for affiliation of a club.

Eighth Annual Search for Talent Now in Progress

About 16,000 high school seniors will enter the Eighth Annual Science Talent Search for the Westinghouse Science Scholarships this year.

From them the judges will choose 300 boys and girls for honorable mention and will recommend them to the colleges, universities and technical schools of their own choice.

Out of the 300 a total of 40 will be selected to attend the annual Science Talent Institute in Washington, D. C., March 3-7, 1949. They will be eligible for \$11,000 in Westinghouse Science Scholarships ranging in size from \$100 to \$2,800.

Students living in Alabama, Georgia, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Montana, Pennsylvania, South Carolina, Tennessee, Virginia and Wisconsin will be entering a state Science Talent Search at the same time they enter the Eighth Annual Science Talent Search for the Westinghouse Science Scholarships.

Through a cooperative arrangement with Academies of Science and colleges in the above states all boys and girls who enter the national will be competing in the state Science Talent Search at the same time and are thus assured of a double chance of winning scholarships and other assistance for further education in science.

Complete details of how to enter the national and state Science Talent Searches are available from Science Clubs of America.

30 States Are Cooperating With Work of SCA

A total of 30 states work with Science Clubs of America to increase opportunities for youth to practice in science.

Academies of Science, colleges, universities, newspapers, museums and other organizations in these states work closely with SCA to give boys and girls a chance to meet together, become acquainted with the scientists of the state and to visit places of scientific interest in their area.

Cooperating states are putting an increasing amount of time and energy into giving

boys and girls first hand acquaintance with the science of their state and an appreciation of the opportunities for them as developing scientists.

Meetings, conferences, trips, conventions, congresses, fairs, are held. Many states have radio programs, speakers bureaus and publications for the clubs.

All sponsors in affiliated clubs are kept informed of all cooperative arrangements and thus can coordinate national and state functions into the planning of their own club program.

New 1949 Edition of SCA Sponsor Handbook Is Ready

The 100-page SCA Sponsor Handbook, full of time-saving helps and right-at-your-fingertip information, has been completely revised and is now ready to make your science club program and activities the best ever.

Packed into its pages is information on:

HOW TO ORGANIZE YOUR SCIENCE CLUB—this step-by-step outline of how to start a club is a gold mine for the new sponsor and a treasury of ideas for the experienced one.

ACTIVITIES FOR YOUR SCIENCE CLUB—individual and group plans gleaned from the experiences of thousands of clubs.

PROJECTS YOUR SCIENCE CLUB CAN UNDERTAKE—a compilation of 1,000 projects done by science club members is invaluable as a check list.

CO-PROJECTS FOR YOUR CLUB—real jobs in science your members can do with well-known scientific organizations.

HOW TO GET CLUB PUBLICITY—how to let the public know what your club is doing and thus get support for new plans.

AFFILIATED GROUPS IN VARIOUS STATES—lists organizations cooperating with SCA in 30 states.

SCIENCE SERVICE AIDS FOR SCIENCE CLUBS—the many services of this organization for the popularization of science are at your disposal.

HOW TO CONDUCT YOUR SCIENCE FAIR—how to plan a science fair for the smallest school or the largest city.

EIGHTH ANNUAL SCIENCE TALENT SEARCH—how to help the talented seniors to get scholarship assistance for further study of

science in a school of their choice.

RECOMMENDED BOOKS FOR SCIENCE CLUBS—a reading list or a check list for adding to your club or school library contains hundreds of titles of standard or new books in science.

FREE AND LOW COST MATERIALS FOR SCIENCE CLUBS—over 300 companies offer free and low cost materials to supplement club laboratory or library.

WHERE SCIENCE CLUBS ARE LOCATED—a tabulation of the distribution of affiliated clubs in the United States, possessions and foreign countries.

One copy of the SCA Sponsor Handbook is sent free of charge to the sponsor of each affiliated club. (Price to others: \$1.00.)

Activities and Programs Of Affiliated Clubs

HARDINSBURG, Ky.—The B. U. G. S. Club of Hardinsburg High School has taken over the care of the plant life of the school yard. They water the plants during the summer, bring in those that need winter protection and replant them in the spring.

APPLETON, Wis.—The 12 to 15 year olds in the Junior Scientists Club of McKinley Junior High School have started a school museum where they display what they col-



FUN WITH PLASTICS—Birthday parties are more fun when there is no fear of damage caused by breaking or spilling. Here the tablecloth is plastic coated, the children eat from plastic dishes and play with plastic toys. Even the birthday cake is decorated with tiny candles set in plastic candle holders.

lect in their study of chemistry, radio, electricity, minerals and insects.

BAY VILLAGE, OHIO.—The Bay Science Club has its own nature trail with trail markers and identification boards made of masonite.

NEWTOWN SQUARE, PA.—Hamsters and white mice are raised by the Atomettes of Ellis College for experimental purposes. They have a science museum and a nature trail they have laid out on the campus.

MIDDLETOWN, MD.—Since most of the Beaker Breakers at Middletown High School are girls they have chosen to experiment with textiles, drugs and cosmetics. A lighting survey they conducted convinced the community something should be done to provide better lighting in the school building.

MIAMI BEACH, FLA.—The Curiosity Club of Normandy School erected a bird feeding station, established a school garden and put on a chemical magic show before the student body. On weekly field trips they have visited an airfield, shipyard, bakery, dairy, candy factory, fruit packers, gas works, veterinarian, newspaper plant and a farm.

ALEXANDRIA, VA.—At St. Stephens Boys School the 32 members of the Explorers Society planned and constructed a lily pond for the school. They raise fish, mice and pigeons but are interested too in nuclear physics, electricity and radio.

PROSSER, WASH.—The 10 boys in the Sigma Delta Science Club of Prosser Senior High School held an All-Hi Revue and earned over \$400.00 for a science exhibit.

BATON ROUGE, LA.—A question box between students and club members is conducted by the Biology Club of Baton Rouge High School. To further their biological studies they have received animals from Louisiana State University and plants from local garden clubs.

RACINE, WIS.—Outside their club room window the six members of the Science Club of William Horlick High School have their own bee hive. They watch the bees at work through the glass panel walls of the hive and sell the honey to pay for incidental expenses of their other work.

DES MOINES, IOWA.—No one can wear the monogram of the General Science Club of Amos Hiatt Junior High School until he has won a certain number of points by completing science projects. Stars are added to the monogram for additional points won.

HOLYOKE, MASS.—All the movies in the Holyoke High School are run by certified operators who have been trained by the Science Club.

BALTIMORE, MD.—The Chemistry Club of Patterson Park High School is composed of 23 members chosen for high proficiency in that subject. Prevention of accidents is a hobby with the club and their record is clear in spite of the difficult experiments they perform. They have visited local plants making sulfuric acid, oxygen, porcelain and refining ores.

FRESNO, CALIF.—The eight girls in the

Camera Club of San Joaquin High School supply most of the prints for their school paper and year book and make their own Christmas cards photographically.

SYRACUSE, N. Y.—The Grant Science Club of Grant Junior High School has had a Science Fair annually for the past five years. Members advance in rank from third to second to first class and are then entitled to wear the SCA felt emblem. If they earn more than 224 points they may become expert, master and finally (with 1,000 points) member of MIDUX honor society and are awarded the SCA silver emblem. The club has its own news sheet.

SHARON HILL, PA.—The Bi-Phy-Chem Club of Sharon Hill High School is 14 years old. They have just finished a 16 minute 8 mm. motion picture of the activities of their club for one year.

SOUTH BEND, IND.—Noon hours at James Whitcomb Riley High School are enlivened by the free demonstrations put on by the Riley High Mad Scientists. Crowds gather when they demonstrate polarized light, radioactive disintegration, chemical indicators and phosphorescent and fluorescent materials.

ANDOVER, MASS.—The 35 boys in the Science Club at Phillips Academy have free access to the laboratories of their school four afternoons a week. Each member has a project of his own with mechanics and chemistry leading in popularity. The club owns two automobile and one airplane engine, all of which are torn down and reconstructed by the members.

SAN FRANCISCO, CALIF.—Aptos Junior High School is fortunate in having the Projectionist Club. Its 22 boys obtain and show all motion pictures and slides used in the school. They service and operate all projection equipment.

INDIANAPOLIS, IND.—For 18 years members of the Chemistry Club of Shortridge High School have been studying chemistry, visiting places of scientific interest and inviting prominent scientists to speak to them. Seven field trips were made last year in connection with a continuing project of "fingerprinting of Indiana glaciers."

OLTON, TEXAS.—Six scientists from as many professions visited the Olton Science Club in Olton High School during the past year at the request of the 46 members. After giving lectures on the requirements and future possibilities of the professions they answered questions of the members.

CONVENT STATION, N. J.—The Tri Sci Club of 35 girls at St. Elizabeth Academy keeps up a lively and interesting business of preparing and exchanging specimens of all kinds with other schools.

LOS ANGELES, CALIF.—The R. V. Club of Washington High School has devised its own uniform of white shirt or blouse and black skirt or trousers with the SCA felt emblem prominently displayed. They wear their uniforms for science teas, Christmas Carolling and when they visit other clubs.

NEW YORK, N. Y.—The 35 boys and girls in the Audubon Club of Public School 4

do most of their bird observations in city parks. They have their own nature room and school museum run by these 11 to 12 year olds.

MILWAUKEE, WIS.—The 20 boys who make up the membership of the Physics Club of Marquette University High School are weathermen. Their daily weather observations are used by the local station, are published in the local paper and are sent in to the U. S. Weather Bureau. So much interest has been generated in this project that radio stations, suburban areas and parents often request information from them and report data to them.

OKLAHOMA CITY, OKLA.—The seven Retort Tumblers of Capitol Hill High School are making and grinding lenses to get first hand information about their favorite subject, optics.

MILLBRAE, CALIF.—Eight 15 to 18 year olds got interested in nature study through scouting and have banded together in the Natural Science Club. Following any interest of any member they take hikes together to see for themselves plant and animal life in the surrounding mountains and forests and have visited a planetarium and observatory. Their treasures brought back are displayed in a library and exhibit room where members and non-members are welcome to browse at will.

OAK RIDGE, TENN.—The Seekers of Science at Oak Ridge High School like to collect galls, fossils and algae. They are all members of the Tennessee Junior Academy of Science.

FREEMONT, N. Y.—For 17 years students at Freemont High School have belonged to the Science Club. Last year the 25 members visited a ship propeller factory, power plant, village sewage disposal plant and invited lecturers on herpetology and heredity. While the majority lean toward physics and machinery in their interests there are small groups or individuals in almost every field of science.

STOCKTON, CALIF.—The 35 members of the Tom Edison Club of Edison High School go to every spot they can locally that is connected with their varied interests in science but when distances are too great they invite speakers to come to their meetings.

CLARKSBURG, W. VA.—A herbarium of the flowers of Harrison County has been started by the Science Club of Washington Irving High School. The small hot house they constructed themselves is now the home of many kinds of flowers.

CURTIS, NEB.—Every one of the 56 members of the UNSA Science Club of the University of Nebraska School of Agriculture has a project of his own. These range from crops and soils, livestock and poultry to first aid and chemistry.

For full details on how to belong to Science Clubs of America or how to engage in any of its activities write to: Science Clubs of America, 1719 N Street N. W., Washington 6, D. C.

GENETICS

Soviets Reject Mendel

Russian biological leader bans Western viewpoint on heredity. His theory is that environmental forces can alter inheritable characteristics of organisms.

► BASIC AGREEMENT between Soviet and Western viewpoints on genetics is possible on one point—and probably on one point only: that the two schools simply do not use the same language. They may use the same words, but they mean quite different things.

Russia's new official leader in biology, Academician Trofim Lysenko, gives his identification of heredity: "The property of a living body to require definite conditions for its life, its development and to react definitely to various conditions." This translation was made by Russian-born Prof. Theodosius Dobzhansky, now at the University of California, recognized as one of the world's leading geneticists.

But those words, to Western ears, mean physiology and not heredity or genetics, as any high-school biology student will tell you. By heredity or genetics the Western student of the life sciences understands the mode of transmission from one generation to the next of inherited characters or properties, essentially as first described by Gregor Mendel and later amplified by Thomas Hunt Morgan and his followers.

Soviet Biological Teaching

The latter point of view is dogmatically rejected by the now dominant Soviet school of biological teaching. PRAVDA, commenting on Lysenko's report, praises his approach as "essentially materialist and dialectical," and in the next sentence condemns the Mendel-Morgan trend as "in essence a metaphysical and idealist trend." But this is argument by epithet, and gets you nowhere save to an impasse.

Academician Lysenko avowedly looks to the late I. V. Michurin, Russia's "Burbank," as his teacher in the idea that external forces can impress new inheritable characters on plants and animals. Back of Michurin he appeals to Charles Darwin.

One passage in his HEREDITY AND ITS VARIABILITY is interesting in this connection: "Sex cells and other cells serving for reproduction are, as a rule, created, have their origin as a result of the development of the organism as a whole, through transformation, through metabolism of various organs. As a result, the past development is, as it were, accumulated in the cells giving rise to the new generation."

This might well be taken as a paraphrase of Darwin's own theory of "pangenesis," which postulated the carriage of all the qualities of a plant or animal to its germ cells by hypothetical "gemmules"; except that Lysenko is rather less definite about

the mechanism of transfer than Darwin was.

Pangenesis was dropped, even as a theory, after better microscopic methods demonstrated the existence of chromosomes, and mathematical calculations based on their behavior in cell division made possible close prediction of the results of still-untested hybrid matings. However, this whole basis of modern plant and animal breeding in the West (and in the USSR, too, until very recently) is now flatly rejected by Soviet biologists under their new leadership, with the official approval of the Bolshevik Party.

Some recent work in genetics in this country has tended to modify the idea that nuclear genes are the only heredity-determining entities in the cell. Such are the researches of Prof. T. M. Sonneborn of Indiana University and Dr. C. Leonard Huskins of the University of Wisconsin. However, closer examination of these new modes of heredity shows them to be as deterministic as the action of the nuclear genes themselves, so that believers in the inheritance of acquired characters will find no comfort here.

To a detached observer of the human scene there should be something ironically amusing in the present debate. On one side is the school of thought avowedly materialist and hence, it might be supposed, solidly deterministic. Yet its advocates

vehemently assail the idea of determinism in heredity among animals and plants. On the other side is a mixed array of scientists whose personal philosophies run the whole gamut from mechanistic determinism to complete free-will, stoutly defending a highly deterministic biological system first proposed by a Catholic priest!

The present revolution in Soviet biology is of course only the latest act in a long drama, running back more than a dozen years. Late in 1936 word was received in this country that Prof. N. I. Vavilov, then the foremost exponent of Mendelian genetics in Russia and one of the world leaders in his field, had been placed under arrest. Comment was immediate, widespread and unfavorable.

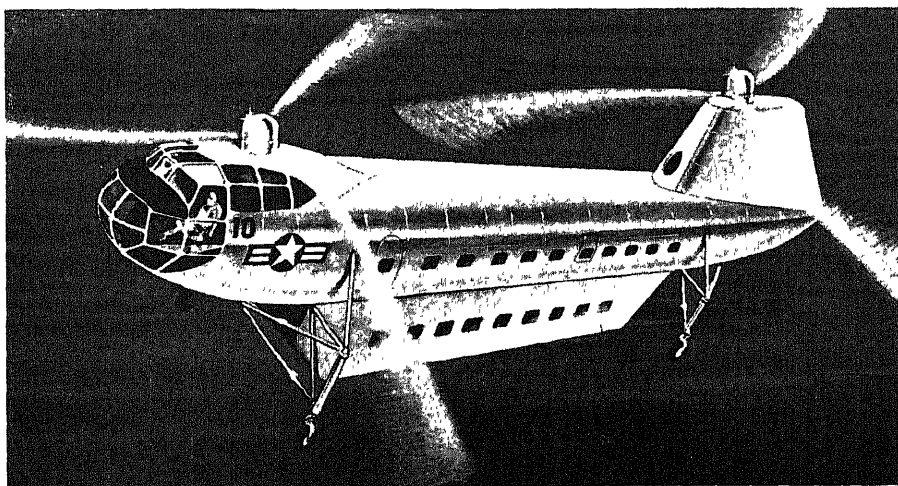
Emphatic Denial

Official Soviet denial of the arrest was prompt and emphatic. It was accompanied by a denunciation in IZVESTIA of alleged editorial comments in this country, in which the New York TIMES and Science Service came in for special mention. In the same article, IZVESTIA announced a forthcoming debate between Vavilov and Lysenko on their points of difference.

In 1939, an international genetics congress was held in Edinburgh, at which Vavilov was chosen to preside. However, neither he nor any of the other Russian delegates attended the meeting.

During the war, reports reached this country that Vavilov had fallen completely from favor, and had died in a Soviet concentration camp, about 1943. Confirmation of this report was lacking, but nothing has been heard directly from Vavilov since then. All other "orthodox" geneticists in the USSR are now in varying degrees of eclipse, and Lysenko and his group are triumphant.

Science News Letter, October 16, 1948



LARGEST TRANSPORT HELICOPTER—This is an artist's conception of the all-metal tandem-rotored Piasecki XH-16, which is as big as a C-54 airliner and the detachable capsule compares with a Greyhound bus in size. The detachable capsule for speeding loading and unloading is estimated to nearly double the payload to be carried by the plane.

GENERAL SCIENCE

Scientific Freedom Urged To Promote Progress

➤ **FREE DISCUSSION** among research scientists in fields of importance to military strength is necessary if America is to keep ahead in new knowledge necessary to national security. Dr. Theodore P. Wright, Cornell vice president for research, warned at the dedication of the Cornell Laboratory of Nuclear Studies in Ithaca, N. Y.

In deciding what is to be kept secret, Dr. Wright declared that it should be realized that "all advanced nations will eventually develop by their own research the knowledge we are striving to keep from them, and within a short period of time."

Cross-fertilization of ideas facilitates advance, Dr. Wright said. The rate of advancement of science is retarded by the introduction of restrictions on the free dissemination of information, he emphasized. Even workers in different fields should have free opportunity for discussion.

"The nation on its toes passes on to next problems long before a mimic nation fully understands and can apply past secrets," he said.

All democracies must remain free from totalitarian restrictions, and the universities must aid military strength to assure this, Dr. Wright declared, adding that universities must aid the military establishment in every way practicable to insure their own basic freedoms.

Science News Letter, October 16, 1948

GENERAL SCIENCE

Seven Gain High Honors For Their Achievements

➤ **ACHIEVEMENTS** contributing to the nation's health have gained seven scientists the 1948 Lasker Awards of the American Public Health Association. Dr. George Baehr, president of the New York Academy of Medicine announced.

Dr. Baehr, chairman of the Association's Awards committee, named as winners in the scientific field, Dr. Selman A. Waksman of Rutgers University, and Dr. Rene J. Dubos of the Rockefeller Institute for Medical Research, jointly, for their work on antibiotics, and Dr. Vincent du Vigneaud of Cornell University Medical College, for studies of transmethylation and contributions to the chemistry of biotin and penicillin.

For outstanding administrative achievement, Dr. Martha M. Eliot of the U. S. Children's Bureau in Washington, and Dr. R. E. Dyer of the National Institutes of Health in Bethesda, Md., were also selected as winners.

The department of medicine and surgery of the Veterans Administration will receive the group award honoring especially Dr. Paul R. Hawley, former chief medical director, and Dr. Paul B. Magnuson, chief medical director, for their program of medi-

cal care for veterans during the war.

The awards consist of \$1,000 each, and a gold replica of the classical statue, The Winged Victory of Samothrace, used in this instance as a symbol of victory over death and disease, for individual winners, and a silver statuette for group award winners. They will be formally presented Nov. 11 at the American Public Health Association's 76th annual banquet in Boston.

Science News Letter, October 16, 1948

AERONAUTICS

Find You Can Get Close to Jet Engine without Danger

➤ **IF YOU ARE** very careful, you can walk up to within two or three feet of the nose of a jet plane while its engine is turning at full power without danger of being sucked in by the intake.

Lieut. A. L. Hall, medical service corps, U. S. N., has just done it at the Naval Air Test Center at Patuxent River, Md. He was able to stand within two feet of the plane, a North American FJ-1 Fury. His reactions, he reports, were like those "caused by a 30-knot wind."

Heavy safety lines were attached to his body while he made the test. Other tests were made with a dummy figure, the size and weight of a man. The results, the Navy emphasizes, apply only to the type of plane used in the experiment. Twin-jet aircraft would have a greater danger area directly in front.

The tests apparently were made because of the speculation on the subject since a civilian mechanic was killed a year ago at the Muroc Dry Lake test center in California when he walked in front of a jet plane and was sucked in.

Science News Letter, October 16, 1948

ENGINEERING

New Technique Gives More Accurate Light Measures

➤ **MORE ACCURATE** light and exposure meters are being developed, using a new technique for building light-sensitive cells, the Illuminating Engineering Society was told in Boston.

Three new instruments using the cells were displayed by G. B. Buck, II, of the General Electric Lamp Department, Cleveland. He explained the new method consists of cementing proper lenses, and in some cases, filters to the cells. This corrects errors caused by both color and reflection, the engineer reported.

The new light meters included a pocket-size meter, low-range meter and a multi-range model. Accuracy of the small pocket meter was listed as within 10% for any color of light or angle of light incidence. The other meters are 100 and 10 times more sensitive, respectively, Mr. Buck said.

Science News Letter, October 16, 1948



MINERALOGY

New Uranium Mineral Found in Belgian Congo

➤ **A NEW RADIOACTIVE** mineral containing the atomic bomb element, uranium, has been discovered in Africa and identified in New York.

The newly-discovered mineral was found in the Belgian Congo. J. F. Vaes, of Union Miniere, Jadotville, Belgian Congo, sent samples to Dr. Paul F. Kerr, Columbia University geologist.

Laboratory tests by Dr. Kerr showed that the material is a previously unknown uranium mineral. It has been named "sengierite," in honor of Edgard Sengier, who directed wartime mineral production in the Belgian Congo.

Sengierite is found in small green crystals which cling to a chlorite-talc rock found in mines in the Belgian Congo. It is similar to the American uranium mineral, carnotite, except that sengierite is a copper uranium mineral, while carnotite is a potassium uranium material.

Science News Letter, October 16, 1948

AERONAUTICS

Helicopters Can Be Towed To Scene of Disaster

➤ **HELICOPTERS** can be towed in the air hundreds or even thousands of miles for use in rescue operations at a remote disaster such as a plane crash, it was proposed.

The U. S. Air Force Air Material Command at Wright Field, Ohio, has been conducting tow tests with helicopters, the semi-official AIR FORCE MAGAZINE disclosed. These tests point up the possibility of using helicopters at the scene of disasters almost anywhere on the earth, the journal indicated.

A large helicopter could take off vertically, with a line attached to the tow plane. When the tow plane had taken off, the helicopter would ease into autorotative flight with its engines shut off. In this way, the rescue helicopter could be towed great distances at high speeds.

When the disaster scene was reached, the helicopter would cut loose and begin rescue operations. It could be towed back by catching the tow line in the air or it could operate independently, if there were airfields in the area.

The Piasecki Helicopter Corporation, Morton, Pa., pointed out that its HRP-1 twin-rotored helicopter might be used in such operations. This plane was described as the only transport helicopter now in production. It seats 10 persons or can carry six litters for rescue work.

Science News Letter, October 16, 1948

CE FIELDS

BOTANY

Grafts Made Successfully On Unrelated Plant Stock

► SUCCESS in making such "impossible" grafts as sweet clover on sunflower, cowpea on tomato, and tomato on geranium is reported by Dr. Louis G. Nickell of the Osborn Botanical Laboratory at Yale University. Hitherto it has been supposed that grafts would "take" only if stock and scion were closely related, as is the case with the tomato-on-potato grafts frequently made.

Most of the experiments described by Dr. Nickell were carried out with the sweet-clover-on-sunflower combination. Here the sweet-clover piece, or scion, was implanted in the pith of the sunflower stalk. Within a week there was good evidence that the grafts were "taking," and some of them remained in healthy growing condition for as much as five months. Microscopic examination of sections showed that permanent connections between the sap-carrying vessels of stock and scion had been made.

Details of the experiments are given in *SCIENCE* (Oct. 8).

Science News Letter, October 16, 1948

NUTRITION

Girl "Guinea Pigs" Aided In Study of Iron in Diet

► SIX LIVELY 13-year-old girls of assorted sizes are back in school after spending their entire summer vacations as "guinea pigs" in a food and nutrition research project at Cornell University. They helped scientists study how much iron a 13-year-old girl needs in her diet for good health. This is the first time such a project has been undertaken.

Being subjects wasn't tough, reported the girls—"it was a lot of fun, like a summer houseparty. Besides, we got an allowance of \$3.00 a week."

They slept two girls to a room in a college apartment, got up at 7:30, made their beds, and went for a short walk before breakfast. A series of rotating chores followed—dishwashing, keeping charts, etc. They played games, went on hikes, attended lectures and did almost anything except take into their mouths unauthorized food or liquid. That is why swimming was taboo. Lake water isn't properly distilled. They could spend one Saturday night at home, but had to take a box breakfast with them. If they got too thirsty while away, they could drink city water if they measured it carefully and reported the amount consumed.

They ate "high" daily—meat every day,

sundaes three times a week; all the lemonade and cookies (special kind) and enriched bread and jelly they wanted between meals—as long as everything was entered in the record book.

The adolescent sextet styled themselves the "Ferric six."

A year from now the scientists will be able to tell the world not only how much iron a healthy 13-year-old requires, but also how she responds to certain levels of calcium and nitrogen.

Science News Letter, October 16, 1948

AERONAUTICS

Floor Chute Allows Escape From New Navy Jet Plane

► A FLOOR CHUTE ESCAPE device features a new Navy twin-jet airplane now undergoing flight tests at the Air Force test center at Muroc Dry Lake, Calif. The plane is an all-weather fighter, suitable to operate from carrier decks, which can also be used as a long-range patrol or long-range escort fighter.

This escape chute is for pilot use should bailing out be necessary at high speeds. At lower speeds, bailing out is provided for through normal methods. Another important feature is speed brakes, consisting of two hydraulically actuated flaps which extend outward from the fuselage just forward of the tail. By the use of these, the pilot can quickly decelerate for slow carrier landing approaches, or for other purposes.

The new plane was constructed by the Douglas Company and is powered by two Westinghouse turbo-jet engines. It will be known as the ZF3D-1, or the Skynight. It is of conventional design, although it has square wingtips. Other details are not yet revealed.

Science News Letter, October 16, 1948

ENGINEERING

Mirror-Making Is Helped By Using Calcium

► MAKING OF special mirrors and other fine evaporation-coating jobs are helped by calcium and related elements serving as go-betweens in ironing out the incompatibility between the tungsten or tantalum heating coil and the gold, silver, copper and other coating metals. Left to themselves, these metals refuse to wet the coil when melted, but just drop off. However, William H. Colbert and Arthur R. Weinrich, both of Brackenridge, Pa., have found that by alloying a little calcium into the coating metal they can get it to spread out nicely over the heating coil, whence it is evaporated and so reaches the surface to be coated.

No less than eight patents, Nos. 2,450,850 through 2,450,857, have been issued on this process. Rights are assigned to the Libbey-Owens-Ford Glass Company.

Science News Letter, October 16, 1948

MEDICINE

Nine Out of Ten Rh Babies Saved by Transfusions

► NINE out of 10 Rh babies are now being saved from death by modern treatment, including replacement blood transfusion, Dr. Louis K. Diamond of Harvard Medical School announced at the New York Academy of Medicine graduate fortnight.

Before 1942, the overall mortality from this disease, he said, was about 40%. At that time treatment consisted of small transfusions, usually of the father's blood. In the following few years, with the use of Rh negative blood for these transfusions, the mortality fell to about 30%. Then when doctors began delivering the baby earlier in cases where the condition was known to be developing, the mortality dropped to almost 20%. In the last two years, using replacement transfusion, the mortality has dropped to about 10%.

In these transfusions, instead of giving small amounts of blood, all the baby's blood is drained and replaced with healthy blood. Only Rh negative blood should be used, Dr. Diamond cautioned.

While this takes care of the blood condition, other complications must be watched for and treated, Dr. Diamond said, "lest the anemia be cured but the patient succumb."

Science News Letter, October 16, 1948

AERONAUTICS

Civilian Airways System Is Inadequate for War

► AMERICA'S air traffic control system would offer "only moderate assistance to our military forces in time of emergency," a Civil Aeronautics Administration official warned the Society of Automotive Engineers meeting in Los Angeles.

The nation has the best air traffic control in the world, but it is inadequate for even today's civilian needs, declared Frederick B. Lee, deputy administrator of civil aeronautics.

Urging the development of all-weather flying, Mr. Lee said, "The split-second tempo of another war will brook no delays for weather."

"Our entire existence as a nation may hinge on the efficiency of the airways system actually operating at the outbreak of hostilities."

The CAA official described plans for an all-weather system for both civilian and military use, agreed upon in detail through the Radio Technical Commission for Aeronautics, and a 15-year program for modernizing and mechanizing the airways. This program, which will require until 1963 to complete, will cost more than \$1,100,000,000. But this cost is far less than the potential benefits, Mr. Lee emphasized.

Science News Letter, October 16, 1948

ENGINEERING

Enough Fuel if Not Wasted

Although production of coal, oil, and gas are approaching an all-time high this year, there is also an increased demand from the field of powered tools.

By A. C. MONAHAN

► THERE WILL BE fuel enough for the nation's homes this winter if fuel users cut unnecessary wastes, and no special emergency arises. Reasonable conservation is all that is required.

Total fuel production is about at an all-time high in America, but demands are higher than ever before. Much of the production is needed for power, which is as essential as heat. But comfortable homes during the cold months ahead will prevail if available fuels are properly used.

There is little that is really new in the practices to be followed to save fuel and still enjoy heating comfort. The steps to be taken are well summarized in a new bulletin of the U. S. Housing and Home Finance Agency, entitled Fuel Consumption in the Home. They are somewhat as follows:

1. The person who pays for the fuel should fire the furnace.
2. Fuels should be selected that are best adapted to the particular heating plant.
3. Houses must be put in good condition to save heat.
4. Heating plants must be kept in good operating condition.
5. Overheated houses waste fuels and cause discomfort to occupants.
6. Proper firing of the particular fuel used is essential.

Fuel Economy

Maximum economy of household fuels means equally as much to the national economy as it does to the individual, the government agency states.

Coal production this year is approaching an all-time high. About 11% more crude oil is being processed this year than last. Natural gas pipe lines have an increased carrying capacity. But this does not mean that there will be fuel to waste.

Along with the increased production there is an increased demand. The American population has increased and there are more homes to heat. Also the use of powered tools is rapidly replacing hand implements, and power requires fuel.

Even the ordinary housewife appreciates this when the monthly electric bill comes in. Then she remembers that all the new electrically driven household gadgets, from heated bed blankets to furniture polishers, use energy that came from fuel.

The demand for fuel oil and gasoline has increased much more rapidly than the demand for coal, although coal is still the

principal household fuel in the United States. Part of the increased demand for fuel oil is a result of conversion from coal heaters to oil-burners. The number of homes in America now heated with oil approaches 4,000,000, compared to some 2,500,000 in prewar days.

But there are other liquid fuel users that play a big part in oil shortages. Horse and mule power on American farms are disappearing. Considerably over 3,000,000 farm tractors are now in use. This is nearly a 60% increase over 1940 figures. Before the end of this year there will be some 40,000,000 motor vehicles on the nation's streets and highways, compared to 38,000,000 in prewar days. They burn gasoline, it is true, but the more gasoline made from petroleum, the less fuel oil is obtained.

Crude Oil

Crude oil does not yield a fixed ratio of oils and gasoline. In the refining process, crudes are "cracked" to yield additional gasoline when the demands for it are heavy. Therefore home-heaters have a primary interest in gasoline conservation, even if they own no automobile. A saving in gasoline makes a larger production of fuel oils possible. Avoiding unnecessary driving and riding will cut gasoline usage, and properly adjusted carburetors save much fuel.

While coal production has increased, demands have increased also. Europe is still in need of American coal. Public utilities are heavy coal users, and the greatly expanded use of electricity for lighting, cooking and power has expanded the demands of the power plants for fuel.

The oil industry seems to be certain that there will be no general suffering this winter for the lack of liquid fuels in spite of increased demands, providing users cooperate by easily taken conservation steps. There may be temporary shortages in certain areas because of distribution problems. The Middle West is the most important of these because much of its supply of oil is brought by tank cars. Present pipelines are inadequate, and delay in laying new lines is due largely to steel shortages.

Barring unforeseen contingencies such as a sudden rise in demand for oil products from the military, the East Coast area will probably have enough gasoline and light fuel oils for the winter provided proper conservation steps are taken by users, a recent report from the Oil Industry Information Committee states. This area is served largely by ocean tankers from the

Gulf Coast, the cheapest form of transportation for petroleum products.

The Gulf Coast area will have sufficient supplies to meet needs because this area produces some 60% of the United States petroleum supply and transportation problems are easily handled. The Rocky Mountain area presents special problems, but the oil industry says they can all be met. West Coast supply and demand is in balance, and no special problem is expected if conditions remain normal.

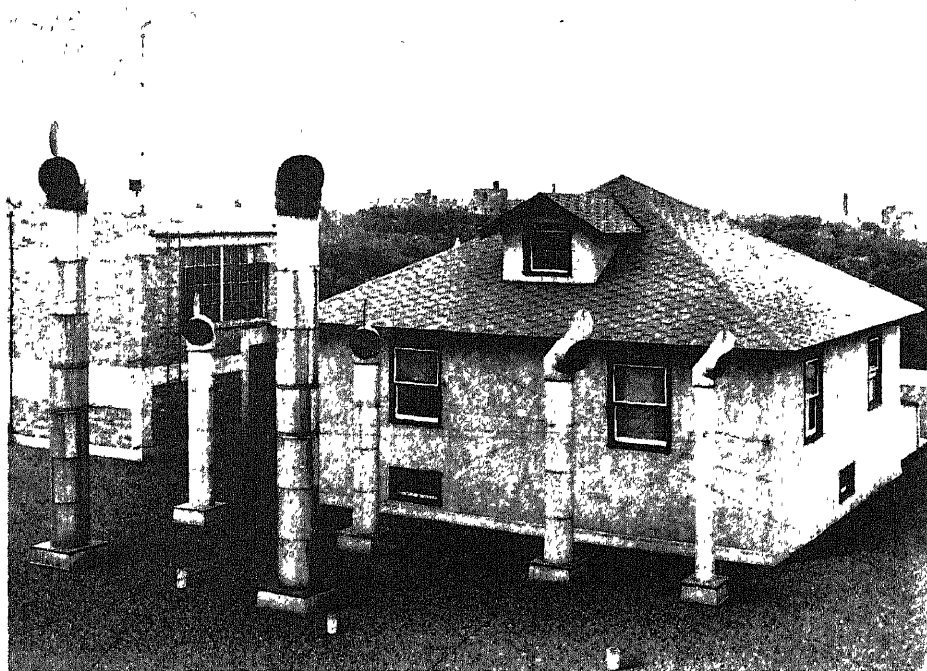
Clean Furnace

To conserve fuel in the oil-burning home, proper cleaning and adjustment of the furnace equipment is important. It is a job for an expert. The cost is more than returned in the fuel saved. The coal-burning furnace needs thorough cleaning and adjustment also, but it is a job that can be done satisfactorily by ordinary users although expert service is desirable occasionally.

The number one essential in cleaning the coal-burner is concerned with the interior walls of the combustion chamber and the upper chamber and tubes where the heat comes in contact with the walls that pass it through to the steam, hot water or air that circulates throughout the house. The layers of soot that form on them can cut heating efficiency from 20% to 40%, allowing the heat to escape up the chimney



PREVENTING HEAT LOSS—Fiber glass stripping is easily inserted in cracks and crevices and along windows to prevent the escape of hot air.



EXPERIMENTS IN HEATING—This bungalow has 144 recording thermocouples to study heat losses from a building and to test new heating controls.

instead of warming the building. The special wire brush, made for the purpose, does a good job if vigorously used, even by an amateur.

Furnace drafts and dampers must be adjusted so that there are no leakages and so that the proper amount of air is admitted to insure complete combustion. One of the greatest losses in the coal burner is due to the escape of combustible gases given off from the heated coal which should be burned completely in the furnace rather than permitted to pass to the outer world by the chimney route.

A house in poor physical condition can not be heated economically. Heat escape must be prevented. Heat losses are through cracks and crevices, unnoted by the ordinary eye, and through walls and windows and doors.

Window stripping is an important item in preventing heat escape. But there are often, even in apparently well-built houses, spaces between window frames and brick or other masonry walls through which air easily passes. A wet finger held near the frame on the inside of a house will often detect the existence of such spaces if there is a wind blowing on the outside.

The answer is simple. It is easy to stuff the cracks and crevices with strips of rags or with some of the special plastic products or putty made for the purpose. A new fiber glass stripping, made by Malanco, Inc., Blue Island, Ill., will not rot, is unharmed by vermin, and can be inserted with the back of a kitchen knife.

Other leak spots are common in basements where the house sills do not fit snugly to the masonry foundation. They

are common also in the attic along the eaves. Great losses occur through the roof itself unless the under sides of the rafters are boxed in with relatively airtight wood or insulation panels. If winter snow melts rapidly in cold weather on the roof of a house, it is a sign that better insulation is probably needed.

Heat losses from ordinary buildings are no longer just a guess. Many scientific studies have been made to determine where they occur and to what extent. University of Illinois studies are outstanding, but other technical colleges may make important contributions. Outstanding work was done also by Minneapolis-Honeywell Regulator Company which manufactures among other items heat measurers and regulators. This company built a special bungalow on a roof-top seven stories above the ground. The building was equipped with 144 recording thermocouples put in all sorts of places. The purpose was two-fold: to study insulation and heat losses, and to test new heating and air-conditioning controls.

Storm windows have been found in all studies to be a number one step in heat conservation. Double sash can save up to 30% of the heat ordinarily wasted from rooms without them. Wall insulation is also important. Another fuel-saving step is leaving unused rooms unheated. It is very important that the fireman knows best firing methods. The techniques with anthracite, high-volatile and low-volatile bituminous coals are far different. Coal companies and state technical colleges usually have available expert directions for using the various fuels.

Science News Letter, October 16, 1948

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From 1937 to 1947, butter consumption in America declined from 16 pounds to 11 pounds per person.

Some 40,000,000 cars, trucks and other

motor vehicles will be using American streets and highways before the end of the year; it is a 17% increase over the 1941 figure.

The importance of chemistry in the world is indicated by the membership in the American Chemical Society; it is the largest professional scientific society in the world and now has some 58,000 members.

To take a census of fur-seals on Alaska's Pribilof islands, every breeding place, or rookery, on the islands was photographed from a plane at 1,000-foot altitude; the fur-seal herd numbers over 3,800,000 animals.

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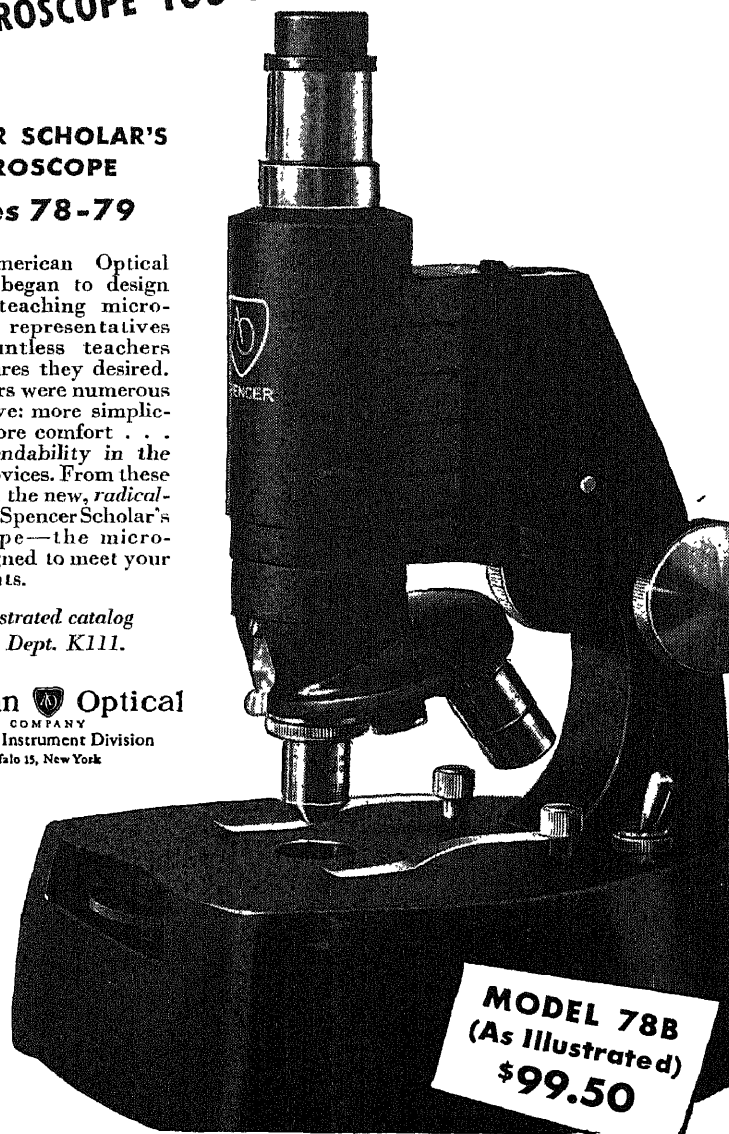
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ENGINEERING

Fuel Oil Saving Possible With New Combustion Head

➤ A SAVING of 25% in fuel oil is possible with a new combustion head for home burners revealed by the Shell Development Company in New York. After several years of testing, the patented device is now available to burner manufacturers without royalty to the developing company.

The new combustion head is for use with high-pressure, gun-type oil burners. It is offered to burner manufacturers without royalty in the interest of fuel conservation. It was perfected by the company in 1944, and first installed for tests in the homes of a few company employees. Since then it has been licensed to a few oil burner manufacturers, permitting them to make it an integral part of their domestic burners.

Design of the combustion head is the key point in efficient oil-burner operation. All other parts of the burner serve merely to convey the air and oil to the combustion head. Here the oil is finely atomized, thoroughly mixed with air and burned. While as much as 150% excess air may be needed with conventional combustion heads, the new Shell head requires only from 5% to 10% excess air. The result is a tremendous saving in heat losses through the chimney, and combustion that is free of soot and smoke.

Science News Letter, October 16, 1948

CHEMISTRY

Simple Sugars Can Now Be Made from Farm Wastes

➤ SIMPLE SUGARS, fermentable into industrial alcohol and other useful products, can be made from the cellulose in corn-cobs, oat hulls, straw, sugarcane bagasse and other farm wastes by a process on which U. S. patent 2,450,586 has just been granted to two U. S. Department of Agriculture scientists, Drs. John W. Dunning and Elbert C. Lathrop of the Northern Regional Research Laboratory at Peoria, Ill.

Wood sugar and related compounds containing only five atoms of carbon per molecule are first obtained by treating the cellulosic material with dilute sulfuric acid. The residue is quickly dried in a current of warm air, ground up fine, and converted into a slurry or thin paste. This is treated with a warm solution of sulfuric acid, at from 7% to 9% concentration, under pressures of from five to 45 pounds per square inch. This converts the cellulose into dextrose, which emerges as a 10% sirupy solution. This is treated with lime to neutralize the remaining acid, and is then ready "as is" for fermentation.

Science News Letter, October 16, 1948

Electric fences, placed along railroad lines where there is danger of rock fall, automatically set block signals in stop position when broken by sliding earth or falling rock.

Announcement to Teachers

"I am a high school student and I find Science News Letter *very useful* in keeping me up on recent developments in science." JOSEPH MAYFIELD, JR., 13517 Van Nuys Blvd., Pacoima, California.

"In conducting research work for a term paper for one of my classes, I have found Science News Letter *the most beneficial and helpful* of all periodicals I have yet had occasion to use." MALCOM M. JULIAN, Elliott Ball Hall, Muncie, Indiana.

"I read your magazine and I think it is wonderful! *It should be in all schools* to promote science and American ingenuity." J. S. BACON, Breaux Bridge, Louisiana.

"I teach General Science in the Junior Part of the School, and naturally have to keep up to date in order to answer all the questions the children are so anxious to ask. It is hardly necessary for me to say *how welcome the postman is, when he brings another issue of Science News Letter!*" J. KENNETH BROWN, c/o Friends School, Hobart, Tasmania, Australia.

"I think that Science News Letter is without doubt, the best way for a science teacher to get the *most for his money.*" A. RALPH BOXELL, Clinton High School, Clinton, Missouri.

"I take this opportunity to tell you that I am enjoying Science News Letter very much. It is a *clear, concise, and comprehensive digest* of current science. I find it very helpful in my science work." SISTER LORETTO THOMAS, St. Joseph High School, Pittsfield, Massachusetts.

"The kids (ages 6-10-11) *go for it each week—swell.*" LT. COMDR. H. SEIELSTAD, U. S. Coast Guard, Cleveland, Ohio.

"I find Science News Letter *very useful in my work* and congratulate you on its development. Wishing you continued success with this valuable magazine, I am," ALFRED J. PYKE, Luther College, Regina, Saskatchewan, Canada.

"We are new subscribers and took only a short subscription as a trial but the entire family find Science News Letter *of great interest.*" MRS. FRED J. HOOPES, Box 52, Paoli, Pennsylvania.

"May I say that Science News Letter is the *most stimulating* non-professional magazine I read? And its book listing brings me references *often not available elsewhere for months.*" MAY V. SEAGOE, Associate Professor of Education, University of California, Los Angeles, California.

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ANATOMY OF PARADISE: Hawaii and the Islands of the South Seas—J. C. Furnas—*Sloane*, 542 p., illus., \$5.00. Romance, history, legend and information are mingled in this readable book issued in cooperation with the American Institute of Pacific Relations.

ATOMIC IMPASSE 1948: A Collection of Speeches by Frederick Osborn, Deputy United States Representative to the United Nations Atomic Energy Commission—Department of State—*Govt. Printing Office*, 48 p., paper, 15 cents. The ideas expressed here, the author says, are "a reaction to being faced with a dreadful problem in close association with a group of able men from diverse nations striving urgently for a solution."

THE BELLEVUE STORY—Page Cooper—*Crowell*, 277 p., \$3.00. This history of a famous hospital founded in 1658 is at the same time an account of much of the medical history of this country. Told in popular style.

BUTCH LOOKS TO YOU—Department of Labor—*Govt. Printing Office*, 18 p., illus., paper, 10 cents. Emphasizing the supervisor's part in the prevention of accidents.

CHARTS ON NUCLEAR PHYSICS—*Westinghouse Research Laboratories*, with supplementary booklet, 36 p., illus., paper, \$1.00 for set, extra booklets 10 cents. Beautiful wall charts

suitable for school room or laboratory portraying graphically in color principles of modern physics.

EARLY DAYS OF OIL: A Pictorial History of the Beginnings of the Industry in Pennsylvania—Paul H. Giddens—*Princeton University Press*, 150 p., illus., \$6.00. A beautiful book that will appeal to those interested in either petroleum or history.

EDUCATIONAL EXCHANGES UNDER THE FULBRIGHT ACT—Department of State—*Govt. Printing Office*, 6 p., paper, 10 cents. Foreign currencies and credits belonging to the U. S. as a result of sales of surplus property abroad can be used to send Americans abroad for study and for bringing students of other nations here.

EDUCATION IN A DIVIDED WORLD: The Function of the Public Schools in Our Unique Society—James Bryant Conant—*Harvard University Press*, 249 p., \$3.00. Having in mind the conflict between the ideas prevalent in Russia and those of the democracies, the author attempts to make clear that "the strength of this republic is intimately connected with the success or failure of our system of public education."

THE ESSENTIALS OF ORGANIC CHEMISTRY—C. W. Porter and T. D. Stewart—*Ginn*, 394 p., illus., \$4.00. Primarily for students of medicine, pharmacy, dentistry, home economics and agriculture as well as for non-science students who want a short course.

FIRST SUPPLEMENT 1948 BIBLIOGRAPHY OF THE GEOLOGY AND NATURAL RESOURCES OF NORTH DAKOTA—Christie E. Budge—*North Dakota Research Foundation*, 90 p., paper, free upon request direct to Research Foundation, Bismarck, N. D.

HAVANA CHARTER FOR AN INTERNATIONAL TRADE ORGANIZATION: Including a Guide to the Study of the Charter—Department of State—*Govt. Printing Office*, 155 p., paper, 35 cents.

AN INTRODUCTION TO COLOR—Ralph M. Evans—*Wiley*, 340 p., illus., \$6.00. A beautiful book written without use of specialized terminology and so suitable alike to photographers, physicists, psychologists and artists. Liberally illustrated in both black-and-white and color.

IT TOOK COURAGE: Tales of Adventurous Discovery—Stanley Rogers—*Holiday House*, 268 p., illus., \$3.00. Romantic stories of scientific expedition and research.

MENDELEYEV: The Story of a Great Scientist—Daniel Q. Posin—*McGraw-Hill*, 345 p., illus., \$4.50. A delightfully written life of the Russian scientist best known for his Periodic Table of the Elements.

NUCLEAR RADIATION PHYSICS—R. E. Lapp and H. L. Andrews—*Prentice-Hall*, 487 p., illus., \$6.00. An authoritative text in a new and interesting field employing a non-mathematical approach. To the general reader, Dr. Arthur Compton points out: "It is studies such as this that change our world."

PHYSICAL GEOLOGY—Chester R. Longwell, Adolph Knopf, and Richard F. Flint—*Wiley*,

3d ed., 602 p., illus., \$5.00. A textbook revised and enlarged.

POPULAR MECHANICS MOTORIST'S HANDBOOK 535 Helpful Hints for Safer, More Economical, and Happier Service From Your Car—Editors, Popular Mechanics Magazine, Eds.—*Popular Mechanics Press*, 156 p., illus., \$2.00. How-to-do-it articles.

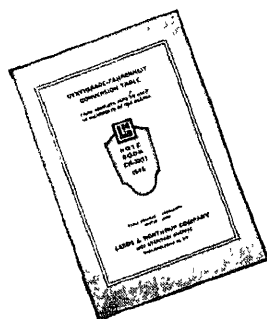
RECENT STUDIES IN THE MECHANISMS OF EMBRYONIC DEVELOPMENT—E. J. Boell, and others—*New York Academy of Sciences*, 205 p., illus., paper, \$3.50. Nine papers by as many authorities in the field.

THE THYROID AND ITS DISEASES—J. H. Means—*Lippincott*, 2d ed., 571 p., illus., \$12.00. Based on the clinical material from the Massachusetts General Hospital.

VERNALIZATION AND PHOTOPERIODISM: A Symposium—A. E. Murneck and R. O. Whyte with others—*Chronica Botanica*, 196 p., illus., \$4.50. An international symposium on the physiology of flowering reporting research in Russia, Germany, Great Britain, U. S. A., and India.

Science News Letter, October 16, 1948

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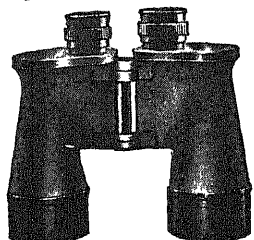
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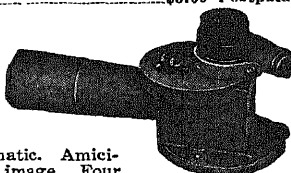
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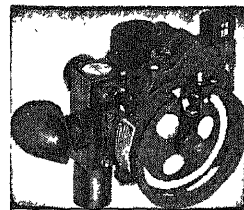
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☛ **COMBINATION LAMP** shade and fish bowl recently patented by the U. S. government, is a circular type shade to fit over an upright electric bulb which has double transparent walls, fastened together on the lower edges with a circular piece to form a water-tight circular bowl.

Science News Letter, October 16, 1948

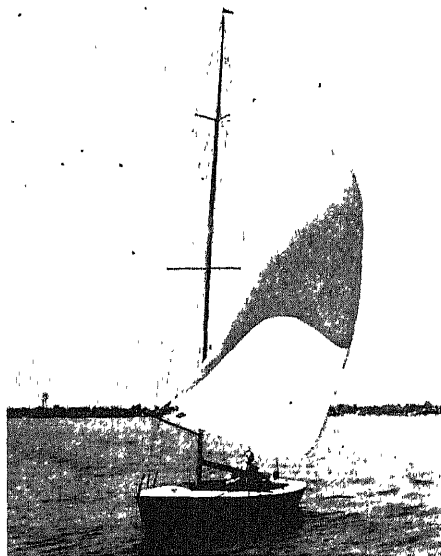
☛ **SNAKEBITE KIT**, containing a lancet, tourniquet and an antiseptic applicator, has an outfit receptacle to hold these articles which is made of a soft material and can itself be used as a suction device. It has a concave mouth that fits with a vacuum seal to the flesh surrounding the bite.

Science News Letter, October 16, 1948

☛ **MICROFILM RECORDER** has a mirror reflex system which makes it possible to photograph both front and back of a document at the same time, and places the two images side by side on 16-mm. film. For single document recordings, one half of the film width can be used at a time.

Science News Letter, October 16, 1948

☛ **NEW TYPE SAIL** for the pleasure boat, shown in the picture, is woven of a new high-tensile synthetic yarn which is dimensionally stable. Water will not make



the sail cloth shrink and wind will not cause it to stretch.

Science News Letter, October 16, 1948

☛ **WINDOW STRIPPING**, made of fiber glass, can be pushed with a knife blade into cracks around doors and windows to keep out cold air, dust and insect pests. Soft and

pliable, it resists moisture, is non-combustible, can not rot and affords no food for vermin.

Science News Letter, October 16, 1948

☛ **EXERCISE TABLE** for curative purposes, recently patented, has a top made of three sections hinged together which can be tilted and flattened again by under-table mechanism. The patient on the table is subjected to continuous motions that impart stimulating massaging of a gentle, undulatory type to the body.

Science News Letter, October 16, 1948

☛ **SELF-DUMPING** wheelbarrow, an improved type recently patented, carries its load well balanced over its wheel. A coil spring under the scoop-shaped body tilts it forward over the wheel when a lever on a handlebar is pressed downward by a thumb.

Science News Letter, October 16, 1948

☛ **CHIMNEY MOUNTING** for radio antenna is an eight-inch square cadmium-steel plate with two standoff clamps, perforated steel straps and turnbuckles. The plate is placed against a corner of the chimney. The steel straps, passed around the brickwork, are tightened by the turnbuckles without the use of other tools.

Science News Letter, October 16, 1948

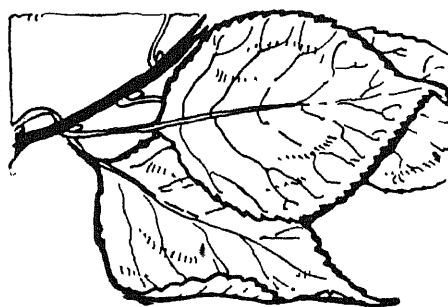
• Nature Ramblings by Frank Thone •

➤ **GOLDEN**, crimson, purple, russet, scarlet—autumn's brave banners gladden our eyes, give us something to store in our memories against the bleak winter days soon to come. Yet for the most part we are content to take them as chance brings them to us. We plant trees with spring flowers or summer shade in mind; yet with a little additional thought we could insure properly massed and contrasted autumn beauty as well.

If you have room for only one tree, probably that tree should be a hard maple. No other species offers such a full palette of autumn color as this, its background of bright gold touched here and there with vivid reds and warm orange, and occasional lingering patches of nostalgic summer green.

Clear yellow tones, with less of red tinting, are offered by a number of trees: the birches, the poplars, the hickories, tulip-

Choose Your Colors!



tree and *par excellence* the ginkgo. Linden gives us yellow-to-russet, sycamore or butternut, russet-to-brown. Sassafras tends to take on an old-gold cast.

Not many trees deck themselves wholly in red to bid farewell to the retreating sun. Sumac, which is a tall shrub rather than a

tree, does assert itself right royally. Headiest of all the flaming leaves, however, are those of the sweetgum—a strong, deep wine-red, especially when caught against the afternoon sun.

Oaks are a tribe apart, in their mode of autumn splendor. Their colors are at once noble and somber—purples and deep reds and dark gold mingled with much monastically sober brown. More than any other familiar trees, oaks have a tendency to cling to their autumn robes far into the winter, clinging to them against the fury of January tempests like ragged exiled kings. There is an individualism among them, too; for of three oaks of the same species standing side by side, one will shed all of its leaves, another will hang onto almost all of them, while the third will let go with some branches and hold fast with others.

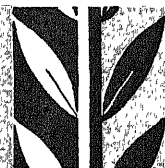
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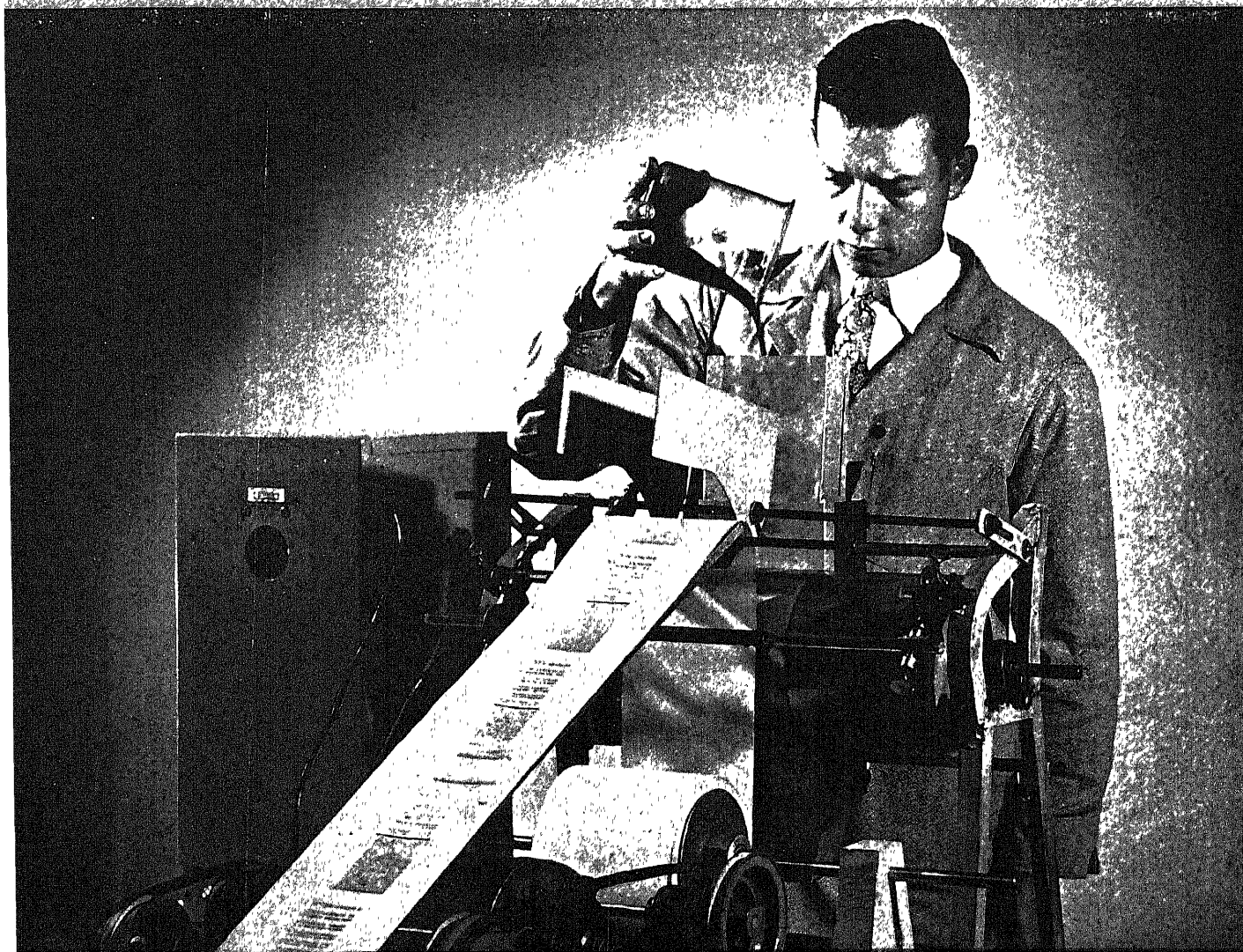
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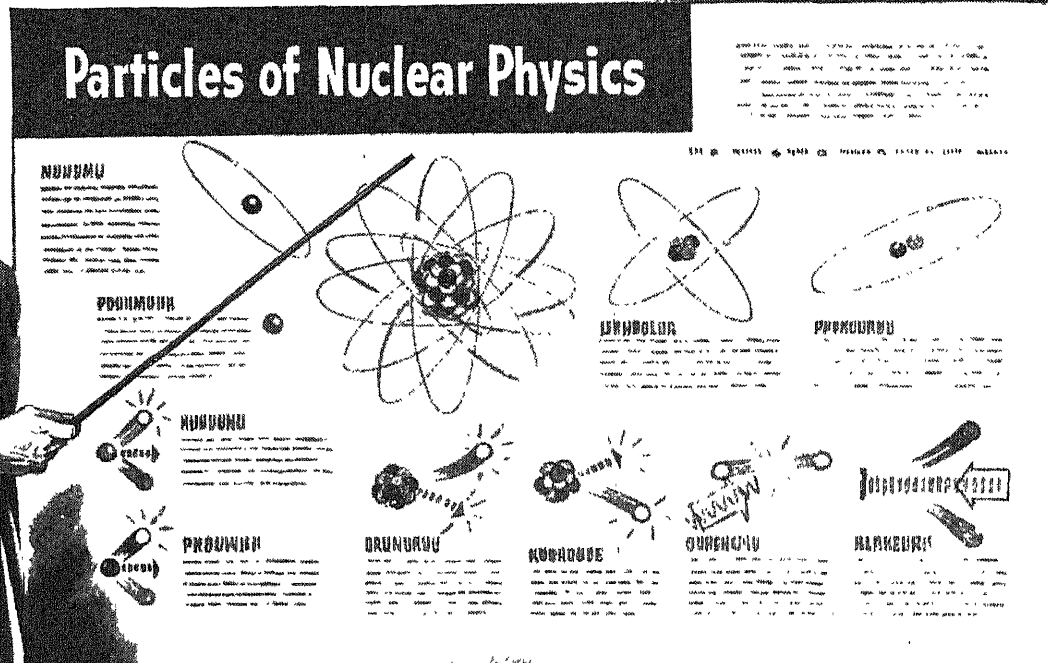
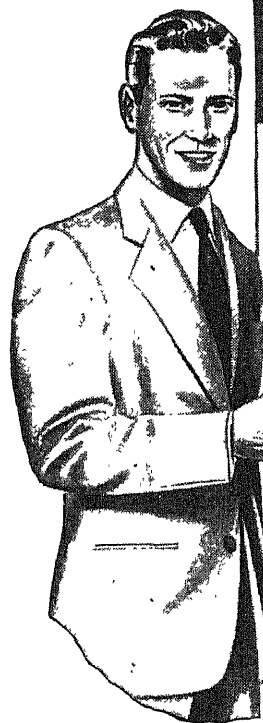
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NUCLEAR PHYSICS

Atomic Storage Batteries

There is a possibility that a large variety of radioactive isotopes of the chemical elements may be produced by the pound from atomic piles.

► PACKAGED ATOMIC POWER may prove to be the way that nuclear energy may be applied to jet planes and rockets, flung at long range at an enemy.

Or the glowing "hot" bundles of radiating material, manufactured in the atomic piles as a by-product of bomb material production, may provide concentrated power sources for remote installations for peaceful purposes, such as heat for polar living.

When Atomic Energy Commissioner Lewis L. Strauss stated recently that atomic "storage batteries" might be made, he was referring to the possibility of the artificial production of large amounts of radioactive material by the intense bombardment in the atomic chain reactors at Hanford, Oak Ridge and elsewhere.

The same effect might be accomplished if a dozen pounds or so of pure radium salts were brought together in one place. Mme. Curie saw the radium bromide she produced glow visibly in the dark with its intense radium. Heat, as well as intense and dangerous gamma and other radiation, is produced by radioactivity, natural as well as artificial.

No one has had or has ever hoped to have pounds of radium, but the atomic piles give the practical possibility of producing by the pound, if needed, a large variety of radioactive isotopes of the chemical elements. Some 600 have already been produced. Of these a score or so might be expected to be useful in the proposed atomic storage batteries.

Most conveniently, these artificially radioactive elements destroy their activity in half-life times ranging from fractions of a second to thousands of years. They literally convert their substance into radiation, and the scientists rate their permanence in the time that is required for half their radioactivity to disappear.

Take sodium, for instance, a common metallic element that is in the sodium chloride of common salt. It has at least three radioactive varieties, created by neutron bombardment, which have half-lives of 23 seconds, 14.8 hours, and three years.

If this element were the active part of an atomic storage battery, the battery could be charged for a very short time or a relatively long time.

The users of such an atomic storage battery could not change its rate of output or vary its length once it was made. This is quite different from the atomic pile itself that depends upon fission of uranium or plutonium by neutrons. The pile can be

speeded up or slowed down by the way it is operated, the fastest operation being an atomic bomb that explodes in a fraction of a second. Radioactive decay follows a rate that cannot change by similar devices.

Very difficult problems remain before artificial radioactivity can be applied practically for power purposes, just as the

MEDICINE

Flour Freed of Danger

The potentially dangerous nitrogen trichloride treatment of flour which has caused fits in dogs, will be discarded soon for a safer process.

► FLOUR for the staff of life, and for macaroni, noodles and pastry as well as bread and biscuits, will soon be freed from the danger of causing fits, in man or dog.

A U. S. Food and Drug Administration order for a change from the potentially dangerous "agene," or nitrogen trichloride, to chlorine dioxide for treating flour from certain kinds of wheat is expected soon.

Sir Edward Mellanby, distinguished English nutritionist who just two years ago discovered the possible danger of agenzized flour and bread, came over from London to give a first hand report of his findings at the Food and Drug Administration hearings.

"Running fits," or canine hysteria, he found, was produced in dogs by feeding them flour treated with nitrogen trichloride. This chemical has been widely used for the past 25 years to age flour from certain kinds of wheat so it will make better bread.

The possibility that the agenzized flour might be causing epilepsy or some kind of nervous disorder in humans alarmed everyone, medical and health scientists as well as the general public.

No hint of any damage to humans from this flour had come in all the 25 years it has been used. Special studies were made in which the agenzized flour was fed human volunteers in amounts and for periods of time that would unfailingly produce "running fits" in dogs. No symptoms and no changes in brain waves, suggesting a tendency to convulsions or fits, were found.

Nevertheless, our Food and Drug Administration, the flour millers of the nation, and manufacturers of "agene," decided to play it safe. So instead of nitrogen trichloride, flour in future will be treated with chlorine dioxide. So far as can be found

methods of applying chain reactors to power production are far from solution. The same protection of human beings and other substances against the lethal and damaging radiations must be achieved, although it might be simpler in some respects for artificial radioactivity.

The conversion of radiation into heat and the transfer of the intense heat and radiation into the kind that can be used practically are major problems, that may take years to solve.

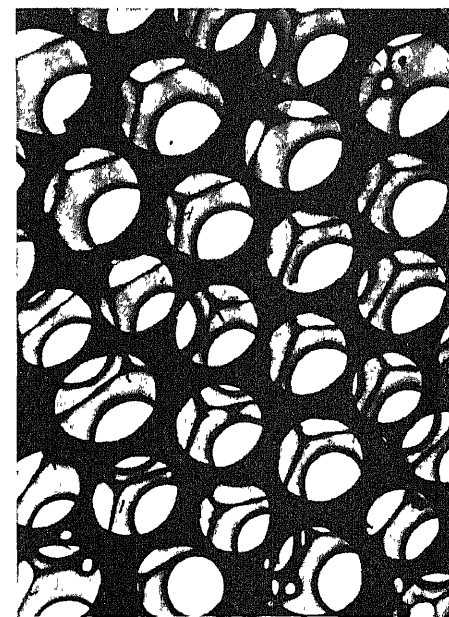
Imagine having an intense energy source in little weight and try to guess what it might mean to rockets and jets, unmanned and radio controlled, aimed at an earthly or even a moon target.

Science News Letter, October 23, 1948

by scientific studies, this chemical has no harmful effect on humans or dogs or other animals.

Technically, the Food and Drug order for the change will come in the form of an announcement of an amended standard for flour.

Science News Letter, October 23, 1948



ELECTRONIC PORTRAIT — This shows the skeleton of a diatom, a microscopic plant used in beer filters, magnified 13,500 times by the electron microscope in the General Electric Research Laboratory.

MEDICINE

Humidity Checks Germs

A 50 percent relative humidity reduces the infecting ability of influenza virus about four-fifths, experiments indicate.

➤ A RELATIVE HUMIDITY of 50% promises to become a weapon against influenza, pneumonia, strep. sore throats and perhaps other diseases on the basis of experiments by scientists at the University of Chicago.

Influenza virus loses almost four-fifths of its ability to attack when the relative humidity is 50%, Dr. William Lester, Jr., of the University's department of medicine finds.

The results of his experiments resemble closely those reported last winter by Edward W. Dunklin and Dr. Theodore T. Puck of the University. They discovered that a 50% relative humidity is rapidly fatal to Type I pneumonia germs, staphylococci and streptococci. (See *SNL*, Feb. 28.)

Viruses were not included in the Dunklin-Puck experiments. Dr. Lester has now exposed white mice to influenza A virus atomized into the air the animals breathed. The amount of virus that killed 100% of the animals at relative humidities of 30% and 80% killed only 22.5% of the animals when the relative humidity was 50%.

The other types of 'flu virus and the virus that causes virus pneumonia may be affected in the same way, though Dr. Lester's report to the *JOURNAL OF EXPERIMENTAL MEDICINE* does not cover studies on these other viruses.

The striking power, or infectivity, of the air-borne influenza A virus decreased so rapidly at a humidity of 50% that it was impossible, Dr. Lester reports, to get a 100% mortality rate in the mice even by greatly increasing the amount of virus.

Salt seems to play an important part in the anti-virus and anti-germ effect of humidity. At 50% humidity all the mice died when exposed to virus free of salt. This is in line with the findings of Mr. Dunklin and Dr. Puck on pneumonia, staphylococcus and strep. germs. They suggested that the humidity plays its lethal role on the germs by dehydrating them to the point where they become most vulnerable to the action of salt. In the Dunklin-Puck experiments germs sprayed from salt solution or from human saliva, which is the natural way they get into the air, were rapidly killed.

Science News Letter, October 23, 1948

ORNITHOLOGY

Sticky-Leaved Weed Catches Young Owl

➤ YOUNG OWLS should watch what they poke their heads into when out strolling; otherwise they may get stuck.

That would seem to be the moral of a brief but curious tale told by Dr. Gordon W. Gullion of the University of Oregon, in the Western bird-study journal, *CONDOR* (Sept.).

Dr. Gullion was on a field trip in the hills west of Eugene, Ore., when he came upon a young owl under a tar-weed, a common wild plant of this region, with leaves made exceedingly sticky by exuded drops of a soft resin. The poor bird had brushed its head against two of the leaves—and there it was, unable to get away or

to move more than a couple of inches.

The little owl was not quite fully grown and had not yet developed its flight feathers. Apparently it had left the nest and was walking on the ground through the bushes when it ran into this "tanglefoot"—or rather tanglefeather—plant.

Dr. Gullion rescued the young owl from its vegetable captor, though he had to pull all the stuck feathers out of its head to get rid of the clinging leaves. Then he put an identification band on one of its legs and let it go.

He suggests that the tar-weed may make occasional catches of this kind that do not end in the rescue of the captured birds.

Science News Letter, October 23, 1948

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How does the new dry printing process work? p. 263

GENERAL SCIENCE

Conant on Education

Harvard president proposes plan for military strength without disrupting college study; adequate schools for all; and dissection of Soviet philosophy.

► THE NATIONAL militia plan for the armed forces, proposed by President James B. Conant of Harvard in his book, *EDUCATION IN A DIVIDED WORLD*, published by the Harvard University Press (\$3) will be received in educational circles as a means of maintaining military strength without disrupting college education.

President Conant suggests enrolling every physically fit boy at 18 or high school graduation for a period of 10 years in the National Guard. Summer camps and evening drill would provide the military training. The boys would have uninterrupted college opportunity that would furnish the specialists in peace and war.

Although this plan is not supported by the military men, educational authorities have been opposed to the wrecking of the college year by even six months of training.

The present draft will not affect college students until next June, as any called will be deferred until the end of a college year.

In the long run, President Conant, himself a chemist, warned against educating more doctors, lawyers, engineers, scientists and college professors than our economy can support. He fears that such people, if unemployed, as in pre-war Germany, might become frustrated individuals who would lead anti-democratic movements.

Primary Education Need

The number one educational need of the present, in President Conant's judgment, is "an understanding of American democratic society and its historical goals, and a dissection of Soviet philosophy and an exposure of its methods."

The necessity of equality of opportunity for youth of each succeeding generation is emphasized by President Conant, who assumes an armed truce until at least the middle fifties and a divided world for a long time to come.

He wants state tax money used to bolster up the schools in parts of the state where local funds do not provide adequate schools. He wants federal aid to education along the lines proposed by Senator Taft. He wants discovery of the various talents in youth early so they can be cultivated. He wants two-year colleges added to local school systems to provide vocational training and training in citizenship at home. He wants a college degree awarded at the end of these two years. He wants some federal scholarships for the best qualified youths in the four-year professional colleges.

"As a nation, we are a long, long way from equality of educational opportunity,"

Mr. Conant reports. "An examination of various localities shows that already in the United States there are wide variations. Instances of very restricted opportunity and instances of very wide opportunity for children of the lower income groups may be easily discovered."

Not only does family income affect a child's schooling, but also the location of his home. Youths in cities, where universities are located, he shows, have a much better chance of continuing their education than youths in rural communities, who must go away to college.

Mr. Conant cites estimates that "as many promising boys and girls fail to go to college for economic reasons as the number who now enter," and he estimates that "somewhat less than one-fourth of the male white population between the ages of 10 and 16 now lives in urban areas within convenient commuting distance of a satisfactory university."

"To the extent that educational opportunity is determined by geography or by family status," he warns, "the increased

importance of formal education in modern America tends to make for social stratification.

"When education more advanced than the elementary schools was hardly required except for a few professions, a man might make a career for himself without benefit of formal learning," he points out; but today "even a man with great native ability whose education stops at the end of grammar school has many doors of opportunity firmly closed."

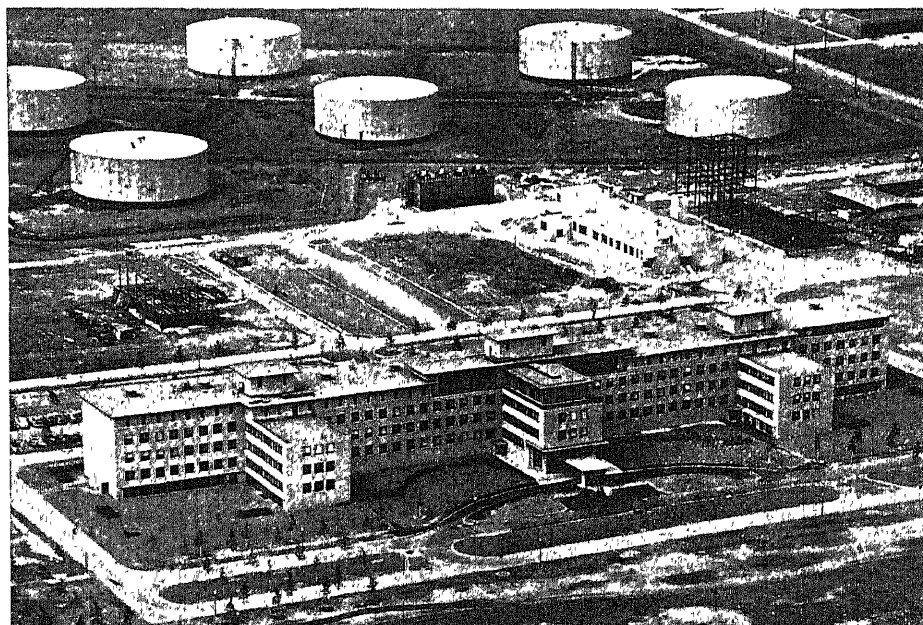
Of America, Mr. Conant says: "Our fitness to survive the Russian challenge clearly depends on many factors, but it depends primarily on a vigorous demonstration of the vitality of our own beliefs in democracy and freedom."

Scientific Method

In his own field of study, Mr. Conant suggests that teachers "reject the extravagant claims for the scientific method as a modern Aladdin's lamp and question the validity of the assumption that the study of physics trains the mind of the future statesman."

Students should be given "the conditions of scientific inquiry, that is to say, the nature of the assumptions about the external world which are essentially those of common sense."

"Then if we seek to spread more widely the desire to examine facts without prejudice and to glorify the bold and impartial inquirers of the 20th century, we should go to other fields than natural science. . . .



NEW RESEARCH CENTER—One of the world's largest petroleum research centers, just opened, was built for the Standard Oil Development Company. The building shown here from the air is the first unit of the center, located at Linden, New Jersey, which will house approximately 650 chemists, engineers and research assistants in its 80 laboratories. In the background are oil storage tanks.

Rather than leave in the minds of the pupils the very dubious proposition that the methods of science are applicable to all manner of practical human affairs, we should show how legal methods of inquiry have been used in Anglo-Saxon countries. Likewise, we must study the rational methods of merchants, manufacturers, soldiers and statesmen which were employed with considerable success for generations,

long before any idolatry of the word 'science' came over the academic horizon."

Despite difficulties and criticism of the method, Mr. Conant believes that "for young pupils the presentation of general science in terms of understanding the earth, the atmosphere, the process of life, and to some degree modern technology, is the most likely way to arouse their interest."

Science News Letter, October 23, 1948

ASTRONOMY

Meteor from Outer Space

➤ A METEORITE weighing 1,164 pounds, the eighth largest rock known to have crashed through our atmosphere and landed in the United States, has been found to have some unusual features.

Deep depressions on the surface of this piece of iron from the heavens probably existed before the meteor became trapped in our atmosphere, E. P. Henderson and S. H. Perry of the Smithsonian Institution state.

The so-called Drum Mountains meteorite from Utah was discovered by chance four years ago by two Japanese from a neighboring relocation center set up for enemy nationals during the war.

These two, Yoshio Nishimoto and Akio Ujihara, were conducting classes in gem cutting for the internees. Exploring the countryside for materials suitable for classroom demonstration, they came upon a large rock protruding two feet above the ground. Thinking the rock unusual, Mr. Nishimoto chipped off a piece and sent it

to the Smithsonian. The complete rock has since been brought to Washington and examined.

The surface of iron meteorites frequently show broad, shallow depressions, popularly known as "thumb marks." This iron has deeper depressions, unrelated to the so-called thumb marks, also observed on some other iron meteorites.

These depressions in the past have been explained by some as due to weathering or rusting out of some constituent after the meteorite landed. Others reported them due to the burning out of troilite, a sulfide of iron, during its flight through the earth's atmosphere. Mr. Henderson and Mr. Perry interpret these markings as ones created in cosmic space, before the meteorites entered our atmosphere.

The meteorite was found resting almost entirely on the surface of the ground. L. B. Aldrich, director of the Smithsonian Astrophysical Observatory, estimates that this 1,164-pound meteorite must have struck the

earth with a force of at least 20,000,000 foot-pounds. Yet no crater was found in the formations in which the iron was discovered, and the surface of the meteorite is surprisingly free from any evidence of an impact as great as this. The meteorite possibly fell some distance from the point where it was found, and either bounced or rolled to the place where it finally came to rest. Or its impact with the earth may have been cushioned by deep snow or loose sand.

Science News Letter, October 23, 1948

VETERINARY MEDICINE

Dogs May Be Poisoned By Chewing on Paint

➤ DON'T LET the pup chew on anything painted, warns the American Veterinary Medical Association. Ordinary paints often contain lead, and there are cases on record of dogs developing lead poisoning after chewing wooden objects covered with such paint. In one case, the animal was poisoned by paint that had been used on his own house.

Science News Letter, October 23, 1948

AERONAUTICS

Five-Engined Plane Used For Flying Laboratory

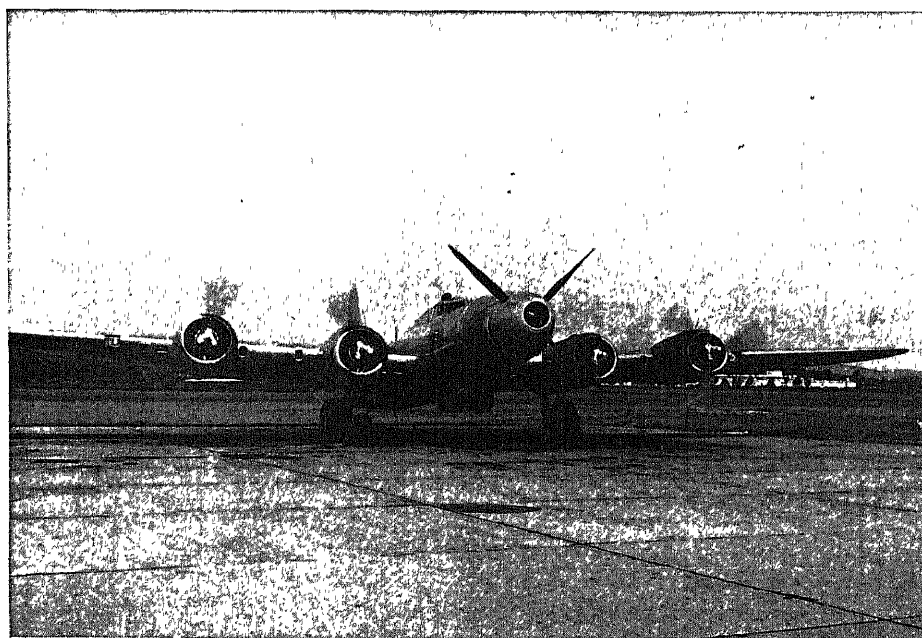
➤ THE MYSTERY of the five-engined airplane observed during the past year in flights over the eastern coastal region of the United States is at last explained. It is a converted B-17 Flying Fortress to which has been added a new engine for testing, mounted in an extended nose.

The new engine is a Wright T-35 Typhoon. To test this new American-designed turbine under actual flight conditions and thereby speed up its development and early use by the U. S. Air Force, Wright engineers conceived the idea of a real flying laboratory.

For the purpose, one of the B-17 Flying Fortresses, that played such an important part during the war, was secured and modified. The changes were made by the Boeing Aircraft Company. The cockpit was moved back four feet, the nose extended, the fuselage reinforced and heavier frames and outer skin installed.

Then the new power plant, equipped with a four-bladed electric propeller, was mounted in the nose section. With this flying laboratory, Wright engineers have tested the new Typhoon engine-nacelle-propeller combination at high altitudes at actual service conditions at a fraction of the cost and time formerly required to test a new power plant. On these flights the Typhoon was operated or not at will, while the power of the four Wright Cyclone engines of the conventional piston type, with which the B-17 is equipped, were adjusted as desired.

Science News Letter, October 23, 1948



FLYING LABORATORY—This B-17 bomber has been converted into a five-engined flying laboratory to test the new high-powered turbine engine, the Wright T-35 "Typhoon."

TECHNOLOGY

Dry Printing Process

Chief advantages of this revolutionary printing process will be the light weight of printing machinery and simplicity of plate-making.

See Front Cover

➤ A REVOLUTIONARY completely dry process for taking pictures and printing was revealed to the Optical Society of America meeting in Detroit.

Static electricity and dry powders take the place of the familiar chemical solutions used in photography, in the new process called "xerography." Xerography was described by Dr. R. M. Schaffert, head of graphic arts research at the Battelle Institute, Columbus, Ohio, and Joseph C. Wilson, president of the Haloid Company, Rochester, N. Y.

They explained that the fast, new, dry process promises to find uses in both the present fields of photography and printing.

A finished picture can be produced in less than a minute with xerography, they reported. The process is simple enough to be followed by an unskilled person, and prints can be made on a variety of materials, such as glass, cloth, metal or wood, in addition to ordinary papers. Because powder is used, it is possible to make the equipment simpler and less costly than in other methods, the meeting was told.

Here is how the new process can be used to take and print pictures:

A photoconductive plate, made by coating a backing material such as a metal sheet with a photoconductive insulating material, is electrically charged by rubbing it with a cloth or some other method in the dark. This makes the plate sensitive to light.

This plate is then exposed to light in a camera, the way that film is used to take pictures. The coating discharges the electrostatic surface charge into the backing wherever the light falls on it. This leaves a latent image on the surface of the plate.

Developing is done by flowing a powder over the surface of the plate as shown on this week's cover of the SCIENCE NEWS LETTER. This powder includes a superfine developing resin and a coarse carrier material. A mirror-reversed image, like a film negative, results. Printing is accomplished by charging the paper on which the picture is to be printed. The powder is attracted to the charged paper to form the image. Fixing is done by heating the paper print for a second or two.

Black developing powder on white paper will create a black and white print, but other colors may be made for multi-color printing, using separate plate images for each color.

Xeroprinting was described as a simpler variation of the xerographic process. It uses a xeroprinting plate on a rotating cyl-

inder. The plate includes a charging device, a mechanism by which the image is developed with a powder developer, a mechanism for transferring the powder image to paper, a method for fixing the powder to the paper and cleaning or auxiliary devices as required.

The image plate is evenly charged by a corona discharge device, but the charge immediately passes off the conductive, non-printing surface, while remaining on the printing surface. As the cylinder turns, the plate enters a developing chamber where powder is applied, and on to where the paper and plate are passed under corona discharge points. Here, the image is transferred to the paper, which passes through a heating unit to fix the image.

Xerography was invented by Chester F. Carlson, a New York patent attorney, who patented the process. He licensed the Battelle Institute to develop the process. Mr. Wilson reported that his company is preparing to market a xerocopying machine for reproducing copies of documents of various sorts. Continuing research on the

process is also being sponsored by the Signal Corps, Department of the Army. A full scientific report of the work by Dr. Schaffert and C. D. Oughton of the Battelle Institute will be published later.

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ENGINEERING

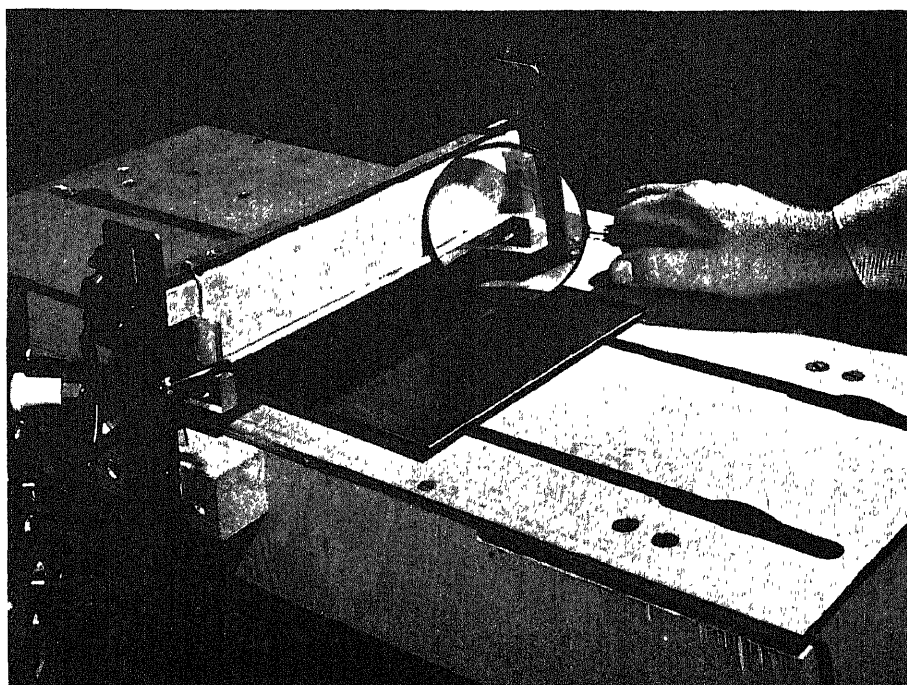
Man-Made Shock Waves Measured by New Device

➤ MAN-MADE SHOCK WAVES passing through the earth, resulting from underground explosions set off by engineers in connection with large construction projects, are accurately measured in velocity and acceleration by a new instrument revealed by General Electric.

The instrument is so designed that it can be buried near the scene of test explosions. It can register shocks up to 1,500 times the force of gravity, and as many as 10,000 impulses per second. The device, the size of a can of baby food, contains crystals which generate a voltage when stresses are applied to them. Signals from the crystals are carried through cables to amplifiers and recorders above ground.

In a recent test of four of these instruments, they gathered data on what sorts of shocks occur 130 feet below 500,000 pounds of high-explosives. The giant explosion was made on the site of Watauga dam, Tenn., to be constructed by the Tennessee Valley Authority.

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ELECTRON SPRAYER—This machine, the only specialized apparatus required for xerographic reproduction, is used both to sensitize the plate and to transfer the powder image from the plate to paper by "spraying" electrons from the fine wire visible through the enlarging glass.

GENERAL SCIENCE

Hiroshima Bombing Gained Soviet Scientists a Raise

► SALARIES of Soviet nuclear physicists were trebled when the atomic bomb exploded over Hiroshima, Dr. I. I. Rabi, Columbia University Nobelist, told an audience at the dedication of Cornell's Laboratory of Nuclear Studies in Ithaca, N. Y.

Comparing the Soviet scientists of today to the alchemists of the Middle Ages who attempted to turn base metal into gold for their patrons, Dr. Rabi expressed doubt that the Soviet scientists find happiness and inspiration in their exalted condition.

The Soviet scientist is expected to produce discoveries which will not only strengthen the state but will support the doctrines of the dominant group, he explained. For success he receives great rewards, country estates, servants, limousines and well-equipped laboratories.

"From the standpoint of basic science such limited and materialistic motivation is irrelevant and even vulgar," Dr. Rabi said. "The real reason for basic research is to expand the boundaries of knowledge pure and simple. It is an expression of the human spirit."

Science News Letter, October 23, 1948

GENERAL SCIENCE

Appoint Biologist Editor Of A.A.A.S. Publications

► DR. GEORGE A. BAITSELL, Colgate professor of biology at Yale University, has been appointed editor-in-chief and chairman of the editorial board for the American Association for the Advancement of Science's two publications, *SCIENCE* and *THE SCIENTIFIC MONTHLY*.

The appointment was announced by Dr. Edmund W. Sinnott, director of the division of sciences at Yale and president of the A. A. A. S.

Serving with Dr. Baitsell on the editorial board of the publications will be: Dr. Arthur C. Bevan of the Illinois State Geological Survey; Dr. Edward U. Condon, director of the National Bureau of Standards; Dr. Bentley Glass of Johns Hopkins University; Dr. Malcolm H. Soule of the University of Michigan; and Dr. Everett S. Wallis of Princeton University.

Science News Letter, October 23, 1948

ENGINEERING

Entire Tree Can Be Used By Converting Wood Waste

► BY CONVERTING wood waste into new forms through new mechanical means, the lumber and plywood industries can make great strides toward the complete utilization of the tree, the American Society

of Mechanical Engineers were told in High Point, N. C., by Armin Elmendorf of the Elmendorf Corp., Chicago. This will result in a great increase in the production of new types of wallboard and synthetic lumber and some of these boards will be superior in many respects to ordinary lumber.

The need for increasing woodworking research was emphasized by George M. Hunt, U. S. Forest Products Laboratory, Madison, Wis. The gap between research findings and their industrial application should be made as narrow as possible, he stated. If the Forest Products Laboratory publishes the essentials of good seasoning practice, the only plants that benefit are those that apply the information to their own operations.

Among recent advance steps made by the laboratory is the development of a process for the manufacture of wood sugar from wood waste. This, he said, has enormous potential benefits to the nation when plants are built and the process is put to use.

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PUBLIC HEALTH

1948 Not Big 'Flu Year Despite the Calendar

► HERE IS good news for you. According to the calendar we were due for a worldwide epidemic this year of influenza and pneumonia such as in 1918 attacked 20,000,000 people in the United States alone and killed over half a million of them. Instead, statisticians of the Metropolitan Life Insurance Company predict that the death rate from these diseases for 1948 will drop below the all-time low reached in 1947.

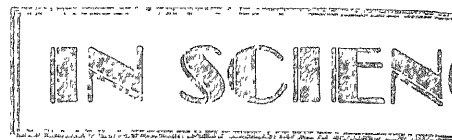
"So far this year," they explain, "there are no signs of an influenza epidemic, either in the United States or elsewhere. This is unlike the situation in 1918, when months in advance of the pandemic serious outbreaks occurred in army camps and naval installations in our country. In Europe, too, there were outbreaks in the spring of 1918."

Although there is no well-defined cycle, these worldwide epidemics have in the past occurred at intervals averaging about 25 or 30 years. Even if major outbreaks should occur, "the medical and public health professions are much better prepared now than 30 years ago to meet the attack," the statisticians point out.

Sulfa drugs and penicillin are mostly responsible for the reduced death rate. Since 1935-37 the decline in deaths from influenza and pneumonia has been proportionally three times as great as in the ten previous years. Last year the rate was 17.4 per 100,000.

However, the battle against these diseases is still not won, they caution. Certain forms of pneumonia, including virus pneumonia, have no specific treatment.

Science News Letter, October 23, 1948



PHYSIOLOGY

Control Center in Brain Called Key to Evolution

► THE BODY'S thermostat, which keeps the temperature of warm-blooded animals at a constant level and enables cold-blooded ones to adapt their life processes to the changes in temperature imposed on them by their environment, is a small but highly specialized part of the underside of the brain known as the hypothalamus. Importance of this brain organ was demonstrated in experiments by Dr. Simon Rodbard of Michael Reese Hospital in Chicago, who reports his findings in *SCIENCE* (Oct. 15).

Other jobs that have been assigned to the hypothalamus, states Dr. Rodbard, include "regulation of blood pressure, respiration, appetite, the diurnal rhythm of sleep and wakefulness, the sexual cycle, and the control of the metabolism of sugar, fat and water."

Coordination of all these functions by one control center, Dr. Rodbard points out, enabled fish to survive in inshore waters where temperature range was greater than in the open sea, then made it possible for fish-like creatures to come ashore as amphibians and reptiles. Increasing efficiency of control accompanied the evolution of mammals and birds from two different reptilian stocks. The hypothalamus can therefore be looked upon as the physiological key to the process of vertebrate evolution.

Science News Letter, October 23, 1948

ASTRONOMY

New Comet Discovered By Lick Astronomer

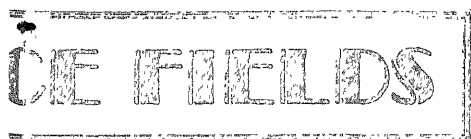
► ANOTHER FAINT COMET has just been discovered by Dr. C. A. Wirtanen of the University of California's Lick Observatory.

Of the 14th magnitude, it is far too faint to be seen with the naked eye, but can be picked up with a ten- to 12-inch telescope.

As this is the third comet Dr. Wirtanen has found so far this year, it will undoubtedly be referred to as Comet 1948 k, the letter "k" denoting that it is the eleventh comet found in 1948. This comet is the ninth new one spotted since January 1.

The comet was discovered with the observatory's 20-inch star camera. Its faint, short fuzzy trail was found on routine plates taken Oct. 7, reports Dr. Charles D. Shane, director of the observatory. Found in the constellation of Aquarius, the water carrier, it was moving southwest.

Science News Letter, October 23, 1948



MEDICINE

Nose Blowing OK During Colds, Sub Men Show

► NOW YOU CAN BLOW your nose when you have a cold, without worrying about getting ear trouble.

Evidence that, contrary to general medical teaching, nose blowing does not cause ear infections comes from 30,000 Navy submarine men trained in the Momsen lung during the war. It was presented by Dr. R. Wallace Teed of Ann Arbor, Mich., at the meeting in Chicago of the American Academy of Ophthalmology and Otolaryngology.

The old idea was that nose blowing during colds forced germs into the tube connecting ear and throat. But the men training in the Momsen lung, a device for escaping from a sunken submarine, had frequently to inflate this tube between ear and throat to equalize pressure in the middle ear as they made their "escape" through the water.

Dr. Teed declared that he was "horried" to see men with acute infections going through this test and inflating their tubes at least 50 times during each test. But of the 30,000 men, about 90% of whom had colds, only one got an ear infection from inflating the tubes.

"The sheer weight of this evidence," he declared, "gradually forced on me the conclusion that the older teaching, that otitis media (middle ear infection) was caused by improper blowing of the nose during an infection, was entirely fallacious and should be discarded."

What causes ear infection, he decided, is direct obstruction of the tube by infection of tissue, creating a relative vacuum in the middle ear, which fills with serum that in turn may become infected; but nose-blowing has nothing to do with it.

Science News Letter, October 23, 1948

GENERAL SCIENCE

U. S. Technology Is Weapon Against Soviet Propaganda

► AMERICAN technical experts and machinery sent to Russia may be "one of the best investments for peace in the future that could be made," Watson Davis, director of Science Service, told a meeting of the American Institute of Electrical Engineers in Philadelphia.

"No Russian could work alongside an American specialist without being immunized to some degree against the malicious hate propaganda against the capitalist system," Mr. Davis declared.

"No Russian can work with American

equipment without being convinced that the American way of life produces successful technology that enriches living and helps all mankind regardless of where he may live on the face of the earth," he explained.

Pointing out that Americans must protest attempts by the Soviets to change scientific facts by decree, as in the case of genetics theory, the speaker said that such acts will correct themselves.

"The next generations—whether they be of fruit flies, wheat or people—will prove the truth," he pointed out.

"Scientific honesty and freedom is at the heart of the democracy of free peoples," Mr. Davis said.

Science News Letter, October 23, 1948

MEDICINE

Tannic Acid Treatment Advised for Poison Ivy

► THE PICNIC SEASON may be over but poison ivy lingers on to plague gardeners getting in some last licks before the snow flies and others who roam the woods to gather autumn leaves and berries for home and school decorations.

For those unlucky enough to get an attack of ivy poisoning, the tannic acid treatment developed some years ago by scientists of the U. S. Public Health Service is said still to be the best known. Injections of preparations of the ivy poison are frowned upon by some skin specialists. Good results have been reported with them in some cases. But some specialists believe the explanation is that in such cases the injections probably were not given until the trouble was about ready to clear up anyway.

The tannic acid treatment can be applied at home, but advice is to consult a physician first, to make sure the trouble really is ivy poisoning, and not some other skin condition that might be made worse by the tannic acid. The treatment is said to stop itching and discomfort from poison ivy within one or two days and to clear up the condition entirely within a week.

Directions are to clean the inflamed area with gauze soaked in alcohol, rubbing vigorously to break the blisters. Then apply a dressing wet with a 10% solution of tannic acid in water. Leave this on for one hour. Repeat the treatment every six hours, breaking any new blisters that have formed.

The tannic acid should not be used on the face or genitals.

Boric acid wet dressings can be used instead of the tannic acid, applying them for several hours several times a day.

Remember that clothing, garden tools, logs for the fireplace and even the cat's fur and dog's hair may be contaminated with the ivy poison. Be sure all these are washed or otherwise cleaned so that handling them will not cause fresh bouts of the trouble.

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ENGINEERING

New Ceramic-to-Metal Seal Improves VHF Radio Tubes

► A NEW METHOD of sealing ceramics to metal offers many advantages in producing tiny radio waves a few inches in length, Dr. C. G. Suits of General Electric revealed. The seal is made by an alloy of silver and titanium.

Most radio tubes, such as those used in ordinary home broadcast receivers, are now made of glass, though some are made with metal envelopes. However, those used for microwaves have much more severe requirements. The tubes themselves must be small, which means that they must operate at high temperatures. This introduces trouble with glass.

A ceramic material, however, seems to meet the difficulties. A type must be used which is strong and retains good insulating properties even when hot. Methods ordinarily used for bonding metal and glass cannot be used with ceramics.

The new technique was developed in the ultra-high-frequency section of General Electric Research Laboratory by R. J. Bondley. The process is carried out in a vacuum at high temperature, which effectively drives out gases in the metal and ceramic parts. This simplifies final evacuation of the tube. The method may be used to join two pieces of ceramic as well as to make a ceramic-to-metal seal.

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PALAEONTOLOGY

Fossils of Early Mammals Brought to Smithsonian

► FOSSILS OF ANIMALS that lived in Eocene time, the dawn period of the Age of Mammals, have been brought back to the Smithsonian Institution in Washington by Dr. Charles L. Gazin, who spent the summer digging for them in western Wyoming and Montana.

Included in the collection is an excellent skull of the little eohippus, the terrier-sized horse that had individual hooflets on each of its separate toes. To zoologists this animal is known as Hyracotherium.

Another notable find is the skeleton of an animal about the size of a sheep. Although it had clawed feet, it is believed to be distantly related to the hoofed animals of the present time. Its scientific name is Meniscotherium.

Near Pipestone Springs, Mont., Dr. Gazin worked in deposits of the second major period of mammalian time, known as the Oligocene. Here he found bones of numerous small animals, forerunners of present-day rodents, dogs and cats, moles and shrews. Most familiar fossils of this age are those of huge, rhinoceros-sized beasts; good fossils of small Oligocene mammals are much rarer.

Science News Letter, October 23, 1948

ASTRONOMY

Orion Heralds Winter

In November this star begins appearing in the evening skies. The planet Jupiter is also visible but sets a few hours after sunset.

By JAMES STOKLEY

► IF THERE IS any group of stars that characterizes the evenings of winter, it is Orion, the warrior. It shines high in the south in January and February. With the coming of November, it begins to make its appearance in the evening skies, thus heralding the winter that so rapidly approaches.

Its position is shown on the accompanying maps. These give the appearance of the heavens at about 10:00 p. m., your own variety of standard time, on Nov. 1; an hour earlier in the middle of the month and two hours earlier at the end. Orion is shown on the map of the southern sky, close to the east point of the horizon. The three stars that mark the warrior's belt are upright. Brilliant Betelgeuse, in his shoulder, is to the left, and Rigel, in his upraised foot, is to the right. As we see it now, the giant is on his back, looking up towards Taurus, the bull, a group in which Aldebaran, another star of the first magnitude, can be seen.

Next to Taurus, to the left, is Auriga, the charioteer, with first magnitude Capella. Below it is Gemini, the twins, of which the brightest star is Pollux, of similar brilliance. The fact that it is so low—and that its light has to pass through a considerable thickness of the earth's atmosphere—dims it so that it appears about a magnitude fainter.

"Great Square"

High in the south are the four stars that make up the "great square" which is mostly in the constellation of Pegasus, the winged horse. Alpheratz, the star in the upper left, is in Andromeda, the chained princess, as the story in Greek mythology had it.

Continuing to the west we find, low in the sky, three more stars of the first magnitude. One is Deneb, at the top of the northern cross; actually part of the constellation of Cygnus, the swan. At the bottom of the cross, now standing upright, is the fainter star, Albireo. To the right of this orb we find another of the highest brilliance, Vega, in Lyra, the lyre. About as high and farther left is the third, Altair, in Aquila, the eagle.

Low in the south there is still another star which the astronomer rates as magnitude one, though like Pollux, its lowness in the sky makes it seem dimmer. This is Fomalhaut, in the constellation of Piscis Austrinus, the southern fish.

One planet can be seen on November evenings. It is Jupiter, magnitude minus 1.5, in the constellation of Sagittarius. It sets only a few hours after sunset, before the time for which the maps are prepared. About midnight Saturn, of magnitude 0.9, rises in the constellation of Leo. It is near the bright star Regulus. Before sunrise Venus appears in the east, in the constellation of Virgo, the virgin. Around Nov. 4 Mercury, then farthest west of the sun, also appears low in the east as dawn is breaking. It stands in the group of Libra, the scales. Our remaining naked eye planet, Mars, is in the figure of Ophiuchus, the serpent carrier, which is so low in the southwest just after sunset that it can hardly be seen.

Third Eclipse

November brings the year's third eclipse. On the first of the month the tip of the moon's dark shadow will cross the surface of the earth, and along its path the sun will be completely hidden. This will not, however, be visible from the United States, nor from any part of the western hemisphere.

Actually, this eclipse already will be taking place as the month of November begins in the United States and Canada, but by Greenwich time, which astronomers use, it is entirely on Nov. 1. At 11:19 p. m., E. S. T., on Oct. 31, the Nov. 1 sunrise will just be taking place in the Belgian Congo, in Central Africa. In that country, at a point a couple of hundred miles west of Stanleyville, the tip of the moon's shadow will first touch earth. From there it sweeps across Uganda and Kenya to the Indian Ocean, and after that effectively misses land. At 2:38 a. m., E. S. T., as the

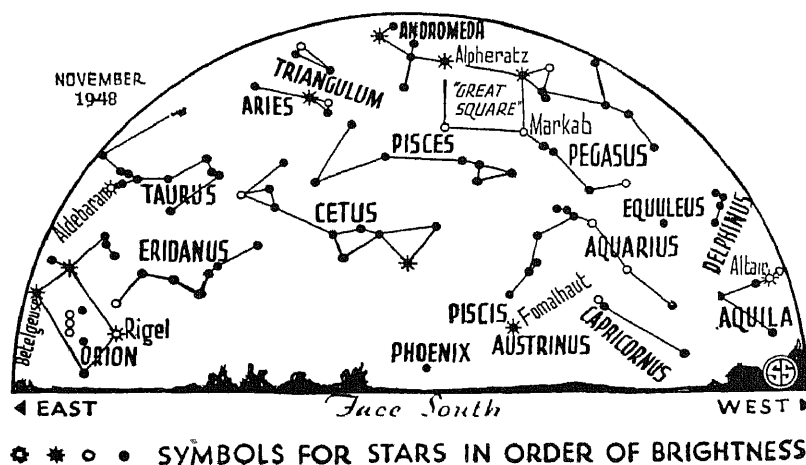
sun is setting in the Pacific a few hundred miles to the west of the south island of New Zealand, the shadow leaves the earth.

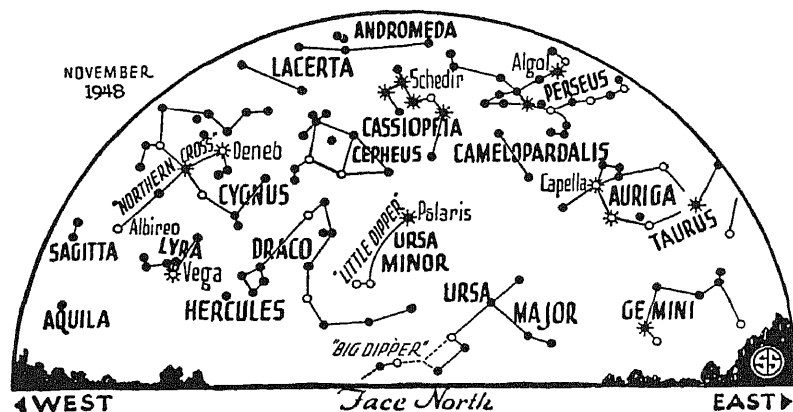
Along this "path of totality," whether on a ship or on land, an observer will see a total eclipse of the sun. The bright disk of that important star will be completely hidden from view, and the pearly white corona becomes visible around the dark disk of the moon. At the Indian Ocean coast of Africa, the total eclipse will last only for about 50 seconds. From the point in the Indian Ocean where the eclipse will occur at local noon, latitude $33^{\circ} 25'$ south and longitude $76^{\circ} 37'$ east of Greenwich, totality will be greatest—1 minute 56 seconds. Over a much larger area, including central and south Africa, Arabia, practically all of the Indian Ocean and most of Australia and New Zealand, there will be a partial eclipse, with the moon only partly hiding the sun.

No doubt astronomers from observatories in South Africa, and there are a number in that country, will make some effort to observe the total eclipse. The short duration of totality and the low altitude of the sun at land stations, where large instruments may be erected, make this eclipse considerably less attractive than others in recent years. There will not be the large attendance of astronomers from Europe and the United States, like those who went to South America and Africa last year to observe the eclipse of May 20.

Path of Totality

After 1948, the next good chance to observe a total eclipse of the sun occurs on Feb. 25, 1952. Then the path of totality traverses Africa, Arabia, Iran and Siberia, with a maximum duration of about three minutes. After that the next is on June 30, 1954. The path on that date starts in the eastern United States at sunrise, and crosses the Atlantic Ocean and Europe. At the





longest this will obscure the sun for 2 minutes 30 seconds. But the following year brings the best total eclipse in centuries. On June 20, 1955, the moon's shadow will cross Ceylon, Siam and the Philippines, and the maximum duration of totality will be the unprecedented figure of 7 minutes 10 seconds, only about 20 seconds less than the greatest possible length of an eclipse. That one will certainly be well observed.

Time Table for November

Nov.	EST
1	1:02 a. m. New moon, total eclipse of sun, visible from vicinity of Indian Ocean

3	11:54 a. m.	Moon passes Mars
4	2:00 p. m.	Mercury farthest west of sun, visible before sunrise
	2:54 p. m.	Moon passes Jupiter
8	11:46 a. m.	Moon in first quarter
10	10:00 a. m.	Moon farthest, distance 251,400 miles
15	early a. m.	Meteors of Leonid shower, though brightness of moon will interfere with visibility
16	1:30 p. m.	Full moon
23	4:22 p. m.	Moon in last quarter
	9:26 p. m.	Moon passes Saturn
25	8:00 p. m.	Moon nearest, distance 229,500 miles
28	1:01 a. m.	Moon passes Venus
30	1:44 p. m.	New moon

Subtract one hour for CT, two hours for MT, and three for PT.

Science News Letter, October 23, 1948

MINERALOGY

Sources of Oil Shale

➤ OIL SHALE, important raw material to furnish fuel oils as petroleum deposits approach exhaustion, is not always a true shale, and it does not contain oil, the American Society of Mechanical Engineers was told in Amarillo, Tex., by Tell Ertl, Union Oil Company of California, Rifle, Colo.

Oil shale is a sedimentary rock containing organic matter insoluble in ordinary solvents but capable of yielding an oil on heating. Some is a true shale since its inorganic matter is argillaceous, that is, composed of clay, but in many the inorganic matter is calcareous or dolomitic. These should be called marlstones, limestones, dolomites or magnesian marlstones. The Green river oil shale of Colorado, Utah and Wyoming is a magnesian marlstone.

The organic matter in oil shale is a solid known as kerogen, that probably consists of a mixture of compounds of carbon, hydrogen, oxygen, nitrogen and sulfur, he stated. On heating oil shale to a temperature above 750 degrees Fahrenheit, the kerogen is cracked into coke, gases condensable to an oil, and non-condensable gases.

Oil shale is found in most of the countries of the world and most of the states of the United States, he said. It was formed in lakes or seas in which the deposit of inorganic matter was slow and in which

abundant organic matter lived or was accumulated. The organic matter of the better known oil shale deposits consists largely of macerated and putrefied microscopic vegetal organisms such as spore cases and algae. Larger vegetal matter, such as leaves and stems, and also animal matter, form part of the organic constituents of oil shales.

The most extensive oil shale deposit in the United States is the black shale of the Chattanooga formation, which is richest in Indiana, Ohio and Kentucky, though found also in 14 surrounding states. It will probably not yield over 15 gallons per ton for any large tonnage.

The richest oil shale deposit in America is found in the Green river formation of Colorado, Utah and Wyoming. It is in this region that the U. S. Bureau of Mines is recovering oil in its plant at Rifle, Colo. The oil shale is resistant to erosion and forms the tops of plateaus, one in each of these three states. The Piceance Creek Basin of northwestern Colorado contains the greatest thickness and highest grade of oil shale deposits known in the United States.

Science News Letter, October 23, 1948

Aluminum alloys are now being used in electrical house-wiring; their use reduces the weight of wire employed by about 50%.

"There are no problem children, only problem environments and parents."

EMOTIONAL MATURITY

by LEON SAUL, M.D.

An authoritative book that presents a wider understanding of the minor mental neuroses from which no one is entirely free. This is not a study of the extremes of insanity, but of the neurotic tensions and vulnerabilities within a person that through the pressure of unfavorable circumstances can drive him to the breaking point.

These neuroses, which may either color or distort a personality, are shown to originate in the attitudes and feelings developed in the parent-child relationship and carried, usually unconsciously, through life. Dr. Saul has taken liberal examples from case histories to explain his points and many of them are from his extensive work with veterans.

For its insight into human motives this book has a special value for all those who deal with people, and makes a practical foundation for more extensive reading in the field.

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Do You Know?

Albacore is the choicest species of tuna fish; its meat is white.

Although known to be a native of the American continent, the exact origin of the common *white potato* is unknown.

Alaska's most troublesome predatory animals are bands of wolves and coyotes; they kill reindeer, mountain sheep, moose, caribou and fur animals.

In a recent five-year period, receipts by the U. S. government from *tobacco* and related products averaged over \$950,000,000 each year.

Titanium is the seventh most common metal and the ninth most common element in the earth's crust; few have seen the pure metal because it is hard to separate from its ores.

A special *menu* is served on airplanes because of certain changes that take place in the body at high altitudes; meals are light and spaced far apart because digestion is slowed down and food remains longer in the stomach than at sea level.

Derris, the roots of which yield the valuable insecticide known as rotenone, is a vine introduced into the Western Hemisphere from the Far East; it grows best in fertile soils at low altitudes in warm, moist tropical climates.

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ENGINEERING

Gasoline Jell Splits Rock

► A NEW PROCESS to crack rock thousands of feet under ground to permit the flow of oil to the well-holes from which it is pumped to the surface was revealed in Dallas by Stanolind Oil and Gas Company at a meeting of the American Institute of Mining and Metallurgical Engineers. The process utilizes jellied gasoline, one of the war's most horrible incendiary weapons.

The jellied gasoline looks like thick mush. It is pumped into the well under very high pressure. It spreads through the underground rock formation and causes it to split and open up cracks through which the oil can flow. Sand suspended in the mush keeps the cracks from closing again. After the rocks are split, a liquid chemical may be pumped into the well. It breaks the mush into a liquid again and the gasoline flows out of the well with the oil.

The new method is expected to help

petroleum engineers solve one of their major problems. This is opening up rock formation so that oil can flow to the well-holes. The method should prove of particular value in the recovery of oil from formations too "tight" for an economical oil flow. By means of it many abandoned wells may be put into operation again.

The new process, to be known as the Hydrafrac method, was explained to the engineers by J. B. Clark of Stanolind's Tulsa research laboratories. It was developed particularly for use in sandstone formations, but it will also work in limestone. It may replace a successful process now used in limestone in which an acid is used to eat holes in the rock. This acid process has not been found satisfactory for use in sandstone formations, and it is in sandstone formations that more than half the oil wells of America are producing.

Science News Letter, October 23, 1948

MEDICINE

Early Baby May Go Blind

► SMALL premature babies, especially those weighing less than three pounds at birth, are being saved by medical science only to face the danger of permanent blindness, it appears from a study by a husband and wife team of eye specialists, Drs. William C. and Ella U. Owens of the Johns Hopkins Hospital and Medical School.

About one in every eight of the infants weighing less than three pounds at birth goes blind, the doctors reported at the meeting in Chicago of the Academy of Ophthalmology and Otolaryngology. They studied 214 premature infants born through a two-year period.

The blindness that threatens these babies is due to a condition called retrolental fibroplasia. It was first recognized only six years ago by the late Dr. T. L. Terry of Boston.

The condition does not exist at birth and therefore is not congenital. About the second or third month, never later than the sixth month, a peculiar membrane develops behind the lens of the baby's eye. Usually both eyes are affected. The membrane in most cases goes on to develop into a fibrous structure which fills the eyeball. The eyeball enlarges to a state resembling glaucoma. The blindness is permanent and usually complete and there is no treatment for it.

As to the cause, Dr. Owens observed that in recent years there has been increased interest in the preservation of the lives of premature infants.

"In an effort to compensate for their physiologic immaturity," he continued,

"these infants are often given diets high in protein, large amounts of vitamins, repeated transfusions of blood and plasma, parenteral amino acids and occasionally hormone therapy. In some premature nurseries penicillin is given prophylactically on admission.

"Whether any of these methods of therapy produce a metabolic imbalance which is related to the disease is as yet unknown."

Dr. Owens said that studies of the nursery records of the children who developed the condition are being made now to determine whether there is any common factor that might be identified as a possible cause.

Science News Letter, October 23, 1948

Funeral vases closely modeled after potato tubers have been found in prehistoric Peruvian graves.

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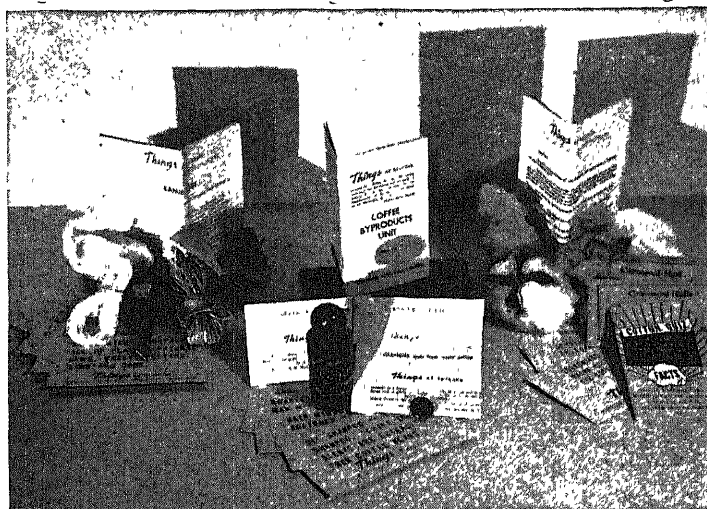
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I AGRICULTURAL PRODUCTS COLLECTION

An oil shampoo, the chief ingredients of which were extracted from coffee beans; complete boll of fluffy white cotton; ramie stem complete with ribbons of fiber just beneath the thin bark—these are some of the exciting objects contained in the COFFEE BYPRODUCTS, COTTON and RAMIE UNITS making up this collection. In the picture you see the 16 specimens that will be yours if you select this group. The oil shampoo, powdered soap, all-purpose cleanser and hair rinse were all made from roasted coffee beans (center). Cotton tinted brown and green by nature, as well as white cotton fibers, a complete cotton boll, cottonseed meal and cottonseed hulls (right) are also included. Ramie stem, ribbons of the fiber, degummed fiber, fiber ready for spinning and completed fabric (left) demonstrate the story of this unique fiber.

II TASTE COLLECTION

Sugar 500 times as sweet as sucrose; pieces of tan-colored bark used to season food; an edible wetting agent often used in chocolate, nut brittle and toffee—these and many other intriguing specimens are contained in the SWEETNESS, SPICE and SOYBEAN LECITHIN UNITS which make this tasty collection. There are 18 specimens in all, including saccharin, dextrose, lactose, allspice, cinnamon, cloves, ginger, sage, mustard, soybeans, pure lecithin and lecithinated flour.

III HOME COLLECTION

Paints that glow in the dark; plastic spoon for measuring coffee; reinforced plastic film for shelf and table covering—these are the interesting objects in the PHOSPHORESCENCE, HOME AND OFFICE, and HOUSING MATERIALS UNITS contained in this collection. The 16 specimens to be found in these three boxes include phosphorescent tape and paint, coffee measure, plastic-and-wire screening, shaver head, wood fiber insulation board, plywood, glass fiber fabric and glass insulation.

IV PLANT COLLECTION

Latex from the sapodilla tree, basic material for chewing gum; crystals that kill insects; brilliant dyes obtained from plant roots—these are the interesting specimens in the CHICLE, INSECTICIDE and VEGETABLE DYE UNITS that will be sent if you order this collection. Included in the 18 specimens making up these three kits are raw chicle, unfinished gum centers, candy-coated gum, DDT crystals, powdered DDT, wettable DDT, pyrethrum flowers and rotenone dust.

V CHEMICAL COLLECTION

Powder from which you can make a length of synthetic fiber; a yellow non-metallic element used for matches, fertilizer and insecticides; zinc made fine-grained by incorporation of only 0.05% lithium—these are contained in the VINYL RESIN FIBER, SULFUR and LITHIUM UNITS comprising this collection. The 20 specimens include vinyl resin, filter cloth, felt, tea bags, sulfur-bearing limestone, pyrites, zinc sulfide, flowers of sulfur, natural spodumene, lithium chloride, lithium nitride, pure zinc and lithium treated zinc.

VI TEXTILE COLLECTION

Material made from cat-tails; twisted cord used in auto tires; soft fibers made from glass—these are the surprising subjects in the UNUSUAL FABRICS, RAYON and GLASS FIBER UNITS. Sixteen specimens are contained in the three packages, and include fabric pressed from spruce-pulp cellulose, "fur" made from the Typha plant, fabric made from milk protein, cotton pulp, chemical cotton in sheet form, rayon fabric lining material, large glass fibers that break easily, and fine ones about .00022 inch in diameter.

VII MINERAL COLLECTION

Stone that attracts bits of iron; remains of trees that lived millions of years ago; bits of semi-precious stone used in sand blasting and abrasives—these are the intriguing specimens in the LODESTONE, PETRIFIED WOOD and SAND UNITS to be sent those selecting this collection. Among the 17 specimens in this set are lodestone, iron filings, compass card, petrified oak, elm, redwood, sweetgum and bog, round sand, greensand, heavy sand, calcareous sand and garnet sand.

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MEDICINE

Cancer Aid from Amazon?

Super-secret head-shrinking solution may be able to shrink cells that have begun to grow wildly back to normal, scientist suggests.

➤ HEADHUNTERS may be bad medicine for their victims but the chemical solution they use for shrinking heads may be good medicine for cancer patients, it was suggested by Dr. Wilburn H. Ferguson, an American-born physician here on a one-man medical mission for Ecuador.

Cancer is a pathological condition in which the cellular tissue throws off all restraints of growth and multiplies haphazardly. Nothing so far has been found to shrink the cells back to normal once they begin their wild growth. Dr. Ferguson believes that experiments with the super-secret chemical solution used by some Jivaro tribes for head-shrinking may open up a new approach to cancer.

He may be the first white man ever to have obtained this material, which is a closely guarded secret among the Jivaro chiefs. At a conference held at the Ecuadorian Embassy, he stated that it took him 17 years before he finally found a Brujo, or chief, who would part with a small jarful of it. He is willing to turn it over to competent medical authorities for experimentation, having been promised by the Brujo that a large enough supply would be furnished.

American authorities on ethnology in Washington, who have made expeditions to headhunting areas, stated that they were not aware that any super-secret solution was used. The headhunters they came in contact with boiled the heads in water and used the juice from the chinchipe vine for its astringent effect.

However, there are over a hundred tribes in the Amazon basin, each using a different type of solution. Dr. Ferguson was impressed with this process because it not only shrinks normal skin tissue to miniature size but also the cartilaginous tissue in the nose and ear. European pathologists

believe that this cannot be done, Dr. Ferguson said.

In all, Dr. Ferguson has brought back some 24 crude drugs used by the Jivaros to treat many conditions. He hopes to interest doctors and researchers in this country in them. He has donated specimens of them to the Museum of the Royal College of Surgeons in Edinburgh, Scotland.

The medical art of the Jivaros has already contributed much to modern medicine. Five widely known drugs, originally used by these people, are quinine, cocaine, caffeine, cascara sagrada (laxative) and curare, in addition to rotenone which is used as an insecticide.

Some of the drugs brought back by Dr. Ferguson that have never been analyzed or experimented with and their use by the natives, are: cana agria, used for jaundice; mano de sapo (frog hand), for intestinal colic and dysentery; raibarbudo, for heart failure and palpitation; copal, a disinfectant for open cuts, tropical ulcers and other sores; guga mama panga, for infections, fevers and other conditions following childbirth.

Dr. Ferguson is here on a mission to interest university medical schools in the establishment of an international teaching hospital for post-graduate students at Quito, Ecuador. He is director of anesthesia at the San Juan de Dios hospital there, which is one of the oldest hospitals on the American continent. It has been in continuous operation since 1565.

Science News Letter, October 23, 1948

GENERAL SCIENCE

Scientists Organize Group On Loyalty Clearance

➤ A "SCIENTISTS' Committee on Loyalty Problems" has been organized in Princeton, N. J., by the Federation of American Scientists.

The new group, which includes Albert Einstein and other well-known scientists, will not "defend" scientists under investigation, it was explained, but it will seek "full and fair hearings." Information and legal advice will be furnished by the committee to scientists with clearance problems.

A statement issued in connection with the announcement of the new committee charges that clearance procedures have "caused some grave and wholly unnecessary injustices to many scientists." This has made it difficult for government laboratories to hire scientists, the statement adds.

Attacked in the statement are:

1. "The doctrine of guilt by association," which, the statement contends, "seems to have been carried to absurd extremes."

2. Restrictions "of any sort" on scientists not doing classified work.

3. "Black-listing" of scientists who have been once refused loyalty clearance.

Listed as another type of loyalty problem is "the public defamation of one of America's leading physicists, Dr. Edward U. Condon, director of the National Bureau of Standards."

"Scientists should take the lead in combating this vicious type of character assassination and in ensuring full public understanding of the facts," the statement concludes.

Chairman of the new committee is Dr. William A. Higinbotham, Brookhaven National Laboratory scientist and former secretary of the Federation. A. S. Wightman of Princeton University will serve as secretary of the group, with D. R. Hamilton, also of Princeton, as treasurer.

In addition to Einstein, members include Dr. H. D. Smyth, Princeton physicist and author of the famous "Smyth Report" on atomic energy; Dr. S. A. Goudsmit, Brookhaven scientist who headed a postwar mission to investigate the scientific effort of the Nazis; Dr. Irving Wolff, director of radio tube research at the Radio Corporation of America laboratories; Dr. M. S. Livingston, of the Massachusetts Institute of Technology; Dr. Stuart Mudd of the University of Pennsylvania School of Medicine; Dr. Oswald Veblen of the Institute for Advanced Study; L. P. Eisenhart, dean emeritus of the graduate school of Princeton University; Dr. Lyman Spitzer, Jr., director of the Princeton Observatory; and D. Bohm, Roy Britten and R. R. Bush, all Princeton University scientists.

Science News Letter, October 23, 1948

Freezer locker plants have multiplied eight times in the past ten years.

A new type of *earthworm*, thought to be from the orient, is stirring up trouble for New England golfers on putting greens; it brings to the surface a much larger amount of casts than ordinary earthworms do.

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Books of the Week

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THE AFFAIRS OF DAME RUMOR—David J. Jacobson—*Rinehart*, 492 p., \$5.00. An interesting account of fish tales that thousands of credulous persons have swallowed enthusiastically.

THE COAST OF NORTHEAST GREENLAND: With Hydrographic Studies in the Greenland Sea; The Louise A. Boyd Arctic Expeditions of 1937 and 1938—Louise A. Boyd and others—*American Geographical Society*, 339 p., with supplement of maps, illus., \$6.00. The author, Miss Boyd, has financed, organized and conducted seven expeditions into the Arctic in ships she chartered and equipped. These reports of her scientific staff, gorgeously illustrated with her own photographs, were previously withheld from publication because of the military value of the material.

DRUG RESEARCH AND DEVELOPMENT—Austin Smith and Arthur D. Herrick, Eds.—*Revere Publishing Company*, 596 p., \$10.00. A large number of authors contribute to this volume telling the story behind the preparation of what the patient takes, including the research, testing, control, and even storage involved.

ELEMENTARY STATISTICAL ANALYSIS—S. S. Wilks—*Princeton University Press*, 284 p., paper, \$2.50. Prepared especially for a short course that is introductory to all fields of investigation.

THE EMOTIONS: Outline of a Theory—Jean-Paul Sartre—*Philosophical Library*, 97 p., \$2.75. Translated from the French by Bernard Frechtman. A philosophical work.

THE INTERNAL COMBUSTION ENGINE—C. Fayette Taylor and Edward S. Taylor—*International Textbook Co.*, rev. ed., 339 p., illus., \$4.25. A textbook revised to include gas turbines and jet engines.

MANAGEMENT OF COMMON GASTRO-INTESTINAL DISEASES—Thomas J. Johnson, Ed.—*Lippincott*, 280 p., illus., \$7.00. A symposium by 19 contributors presenting various divergent opinions.

THE MERCHANT SHIP: Design Past and Present—G. S. Baker—*Sigma*, 159 p., illus., \$3.65 approx. For those who love ships.

PAPERS PRESENTED AT THE NAVAL ORDNANCE LABORATORY MAGNETIC MATERIALS SYMPOSIUM—U. S. Naval Ordnance Laboratory, 61 p., illus., paper, free upon request direct to the Office of Technical Services, Washington 25, D. C. Papers presented in June, 1948, before a group which had succeeded in adapting Ger-

man techniques and material for American use and had developed one new-type magnetic material.

PEDIATRICS AND THE EMOTIONAL NEEDS OF THE CHILD: As Discussed by Pediatricians and Psychiatrists at Hershey, Pennsylvania, March 6-8, 1947—Helen L. Witmer, Ed.—*Commonwealth Fund*, 180 p., illus., paper, \$1.50. Discussion resulting from the bringing together of baby doctors and specialists in mental health. Of interest not only to physicians but also to parents and teachers.

THE PLAGUE AND I—Betty MacDonald—*Lippincott*, 254 p., \$2.75. The amusing author of "The Egg and I" finds something to laugh at in a personal battle against tuberculosis including life in a sanatorium.

PRACTICAL DISC RECORDING—Richard H. Dorf—*Radcraft*, 96 p., illus., paper, 75 cents. Presenting a new hobby for radio enthusiasts.

RADIO AT ULTRA-HIGH FREQUENCIES, VOLUME II (1940-1947)—Alfred N. Goldsmith and others, Eds.—*RCA Review*, 485 p., illus., \$2.50. A technical book for scientists and engineers.

STUDIES OF PROPERTIES OF SULFUR JOINTING COMPOUNDS—W. W. Duecker and others—**BACTERIAL OXIDATION OF SULFUR IN PIPE SEALING MIXTURES**—Lloyd R. Frederick and Robert L. Starkey—*American Water Works Assn.*, 21 p., illus., paper, free upon request to Mellon Institute, University of Pittsburgh, Pittsburgh 13, Pa.

SUBMARINE GEOLOGY—Francis P. Shepard—*Harper*, 348 p., illus., \$6.00. A textbook—the first in this field—but written in non-technical style so as to be interesting to all who have wondered about reefs and coastlines, waves and the bottom of the sea.

SYMPOSIUM ON NUTRITION OF THE ROBERT GOULD RESEARCH FOUNDATION, VOLUME I, NUTRITIONAL ANEMIA—Arthur Lejwa, Ed.—*Robert Gould Research Foundation*, 194 p., illus., free upon request direct to publisher, Carew Tower, Cincinnati 2, Ohio. Papers by eleven investigators covering chemical, physiological and clinical aspects.

TRANSFORMERS: Theory and Construction—W. C. Sealey—*International Textbook Company*, 256 p., illus., \$3.00. A practical book.

VOYAGES TO THE MOON—Marjorie Hope Nicolson—*Macmillan*, 297 p., illus., \$4.00. Taking the reader out of this world on flights of fancy and legend collected from literature.

Science News Letter, October 23, 1948

ter, Minn., at the meeting in Chicago of the American Academy of Ophthalmology and Otolaryngology.

Curare paralyzes reflexes, he explained. In operations on the throat, even simple ones, the gagging reflex must be abolished and ordinarily this requires very deep anesthesia. The sneeze reflex which goes into action when the surgeon touches the iris of the eye also requires deep anesthesia to abolish it.

Ether and other gases abolish these reflexes, but are often barred because of the danger that a spark from the electrocautery used in such operations might cause an explosion. Gas anesthetics present a special problem because the operations inside the throat are done in the same area where the apparatus for the anesthesia must be maintained.

Pentothal, an anesthetic which can be given by vein, eliminates these problems, but must be given in very large doses to suppress the throat reflexes. But when curare is used with it, Dr. Adams said, smaller doses of pentothal can be given. He called the combination of these two drugs a "tremendous advance."

Science News Letter, October 23, 1948

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Before Doing Something About Your Hearing

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MEDICINE

Arrow Poison Used In Throat Surgery

➤ CURARE, the poison South American Indians used generations ago on their arrows, is now being used by modern surgeons when operating on the throat. Its value in supplementing and reducing high dosages of common anesthetics was reported by Dr. R. Charles Adams of Roches-

• New Machines and Gadgets •

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❁ **HOSIERY PROTECTOR** is made of waterproof, transparent plastic and fits over the top of the shoe like a legging. It has forward and rear edges, and opens along one or the other. It has a slide fastener for closing the opening, and a strap under the instep to hold the protector tight to the shoe.

Science News Letter, October 23, 1948

❁ **REPAIR DISK**, for use when record changers enlarge and damage the pivot holes of disk voice and other recordings, is a small circular plastic piece with a center hole quickly cemented to the damaged recording.

Science News Letter, October 23, 1948

❁ **SKETCHING BOARD**, for use in a pad on a desk, is a Vinylite plastic sheet on which either pen or pencil may be used. Marks remain until erased by wiping the sheet with a cloth which has been dipped in a special remover fluid that comes with the board.

Science News Letter, October 23, 1948

❁ **HEATING CABLE** installed on roof edges, as shown in the picture, keeps melting snow from backing up under shingles and eaves. It is an electric cable, plugged into the ordinary household outlet only



when needed and consuming only one cent's worth of electricity an hour.

Science News Letter, October 23, 1948

❁ **MILK BOTTLE HOLDER**, a newly patented device to make pouring from the bottle easy, is a pitcher-shaped affair with a handle. The pitcher is in two parts.

hinged together, easily opened so that the bottle may be placed inside with the top of its neck protruding.

Science News Letter, October 23, 1948

❁ **LIQUID-COOLED beer keg**, a metal type recently patented, is a keg within a keg, with provisions for circulating a cold liquid between the two. Also to help cool the beer, cross tubes extend through the inner keg through which the cold liquid can pass.

Science News Letter, October 23, 1948

❁ **PARACHUTE PACK**, for Navy planes in dropping ordnance and other materials to the ground, is made of glass fiber and plastic resins, and has high strength and light weight. The pack is made in two pieces, a dish-like section and a cover section. When the unit is dropped, a spring opens the lid and releases the parachute.

Science News Letter, October 23, 1948

❁ **HEATING DEVICE** for canned foods, recently patented, is a container with a chemical layer at the bottom and means of adding water to activate the chemical to generate heat. The can to be heated is placed within; a tight-fitting cover on the container keeps the chemical dry until wanted for use.

Science News Letter, October 23, 1948

• Nature Ramblings by Frank Thone

► **WILDERNESS** areas in the national forests are not going to be hospitable to airplanes, automobiles and motor boats if recommendations of conservationists in the National Resources Council of America are carried out.

They regard penetration by motorized travel as potentially destructive of the very things which the sportsmen and vacationers are in such a roaring hurry to enjoy.

The problem of motorized penetration of the wilderness has been growing increasingly acute in the past two or three years, with amphibian planes and flying boats hopping in a few hours over hundreds of miles of forest, to alight on lakes hitherto reached only after many days of hard travel on foot trails or by canoe. The sudden increase in numbers of fishermen and hunters getting into the Big Woods by motorized travel seriously threatens to destroy fish and game populations, the scientists fear.

Wanted: Quiet



Their consensus is that it is all right for planes and motor vehicles to come to the edge of the wilderness, but that when you actually enter the areas you should go on your own feet or paddle your own canoe. This is essentially the policy

already adopted in Canada, they point out, and this practice should be even more carefully adhered to in this country where remaining wilderness areas are far smaller and fewer than they are in our neighbor to the north.

The policy advocated by the delegates, who represent the leading conservation and wildlife organizations of the U. S., is intended to apply particularly to the officially designated wilderness areas of the national forests. These are isolated, remote tracts, with few or no roads, meant to be kept in as nearly primeval condition as is still possible. In addition to their recreational uses by hardy hikers and canoeists they have high value to scientists, who can learn in them the ecological lessons needed for the restoration of America's all-but-vanished forests.

Science News Letter, October 23, 1948

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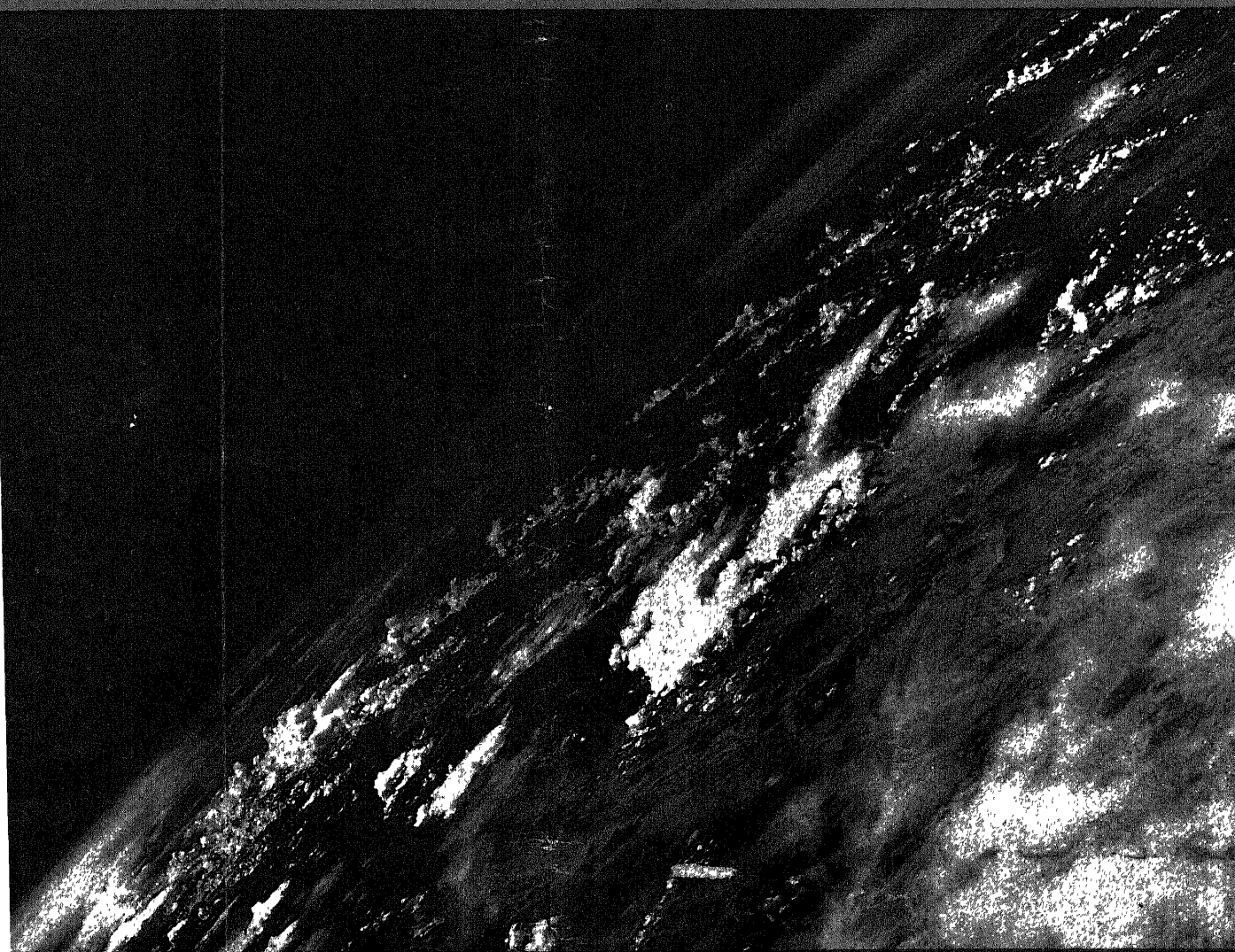
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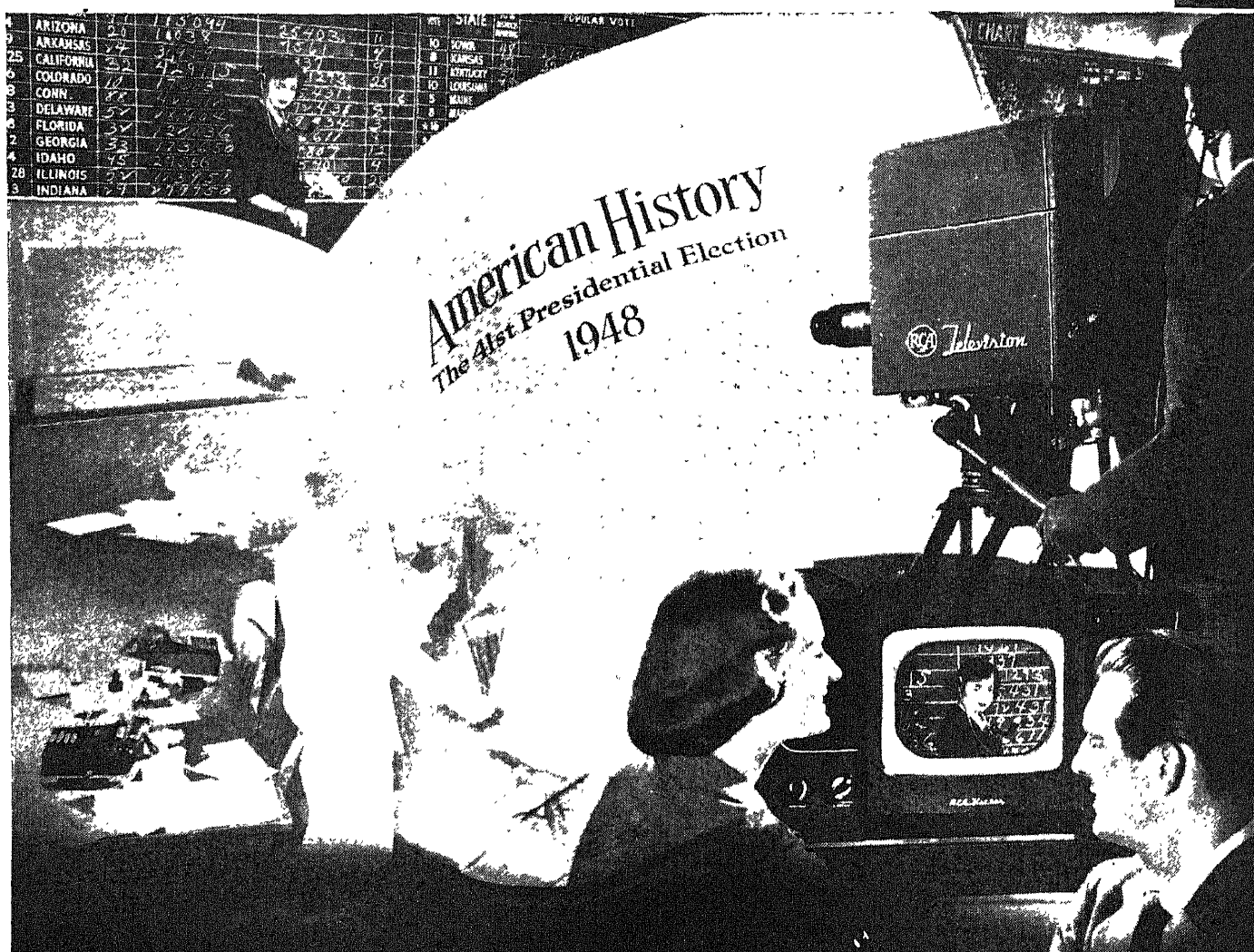
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MEDICINE

Surgical Aids for Heart

Cutting off the top of the heart and wrapping the aorta in plastic to prevent its bursting may help in prolonging the life of the patient.

➤ OPERATIONS in which a piece is cut off the top of the heart and others in which the aorta, main artery leading from the heart, is wrapped in plastic to prevent its bursting, were reported at the meeting of the American College of Surgeons in Los Angeles.

The heart topping operation is designed for patients with rheumatic heart disease who are in danger of having a clot plug an artery of arm or leg. In 90% of such cases the clots come from one of the upper chambers of the heart, particularly from the muscular pouches at the top of these chambers called auricular appendices. Two cases in which this operation was performed on the left side of the heart were reported by Dr. John L. Madden of Long Island College of Medicine and Kings County Hospital, Brooklyn. One of the patients survived, the other died.

The operation gives promise of providing surgeons with an avenue for easier operations within the heart than are now possible, Dr. Walter J. Burdette of Louisiana State University School of Medicine reported. Working on dogs, he found it possible either to remove the auricular appendix or merely to open it safely. Opening it gives greater visibility and consequently easier operation within the heart.

Any piece of heart muscle removed in such operations, Dr. Burdette advised, should be saved for studies which might help clear up some fundamental problems of human heart function and its changes in disease.

Five patients have lived one to three years with their aortas wrapped in one of the modern plastics, a commercial polyethylene film, Dr. J. Carl Poppe of Portland, Ore., reported. He has done the plastic aorta wrapping operation on 10 patients within the past 38 months. The patients each had a sac, called an aneurysm, formed by the dilatation of the aorta in the chest. The condition resulted from syphilis. It causes pulsating, or throbbing, pain in the chest and the patient is in danger of rupture of the big artery and massive bleeding.

Four of the five patients who had this operation from one to three years ago have had enough relief of pain in the chest so that they could make a partial or complete return to their normal activities. One of these five died a year and a half after the operation from rupture of another part of the aorta.

Of the other five patients, two died from progression of the disease within four to eight weeks after the wrapping, two can-

not be traced and are believed to have died, and one has been treated too recently for evaluation of the results.

The good results are due to the fact that the plastic wrapping is a substance foreign

to the body. In reaction to this foreign material, the body develops tough, fibrous tissue. In preliminary studies with animals, Dr. Poppe found that within two weeks after the wrapping the walls of the aorta were markedly thickened as a result of this fibrous tissue reaction, and the dilated bore, or lumen, had become smaller. The reaction was even greater three months later.

DuPont polythene film was found most suitable of all the commercial varieties because it contains dicetyl phosphate. This chemical was found to be the irritating material that caused the healing reaction.

Science News Letter, October 30, 1948

AERONAUTICS-CHEMISTRY

Fluid Cuts Fire-Hazard

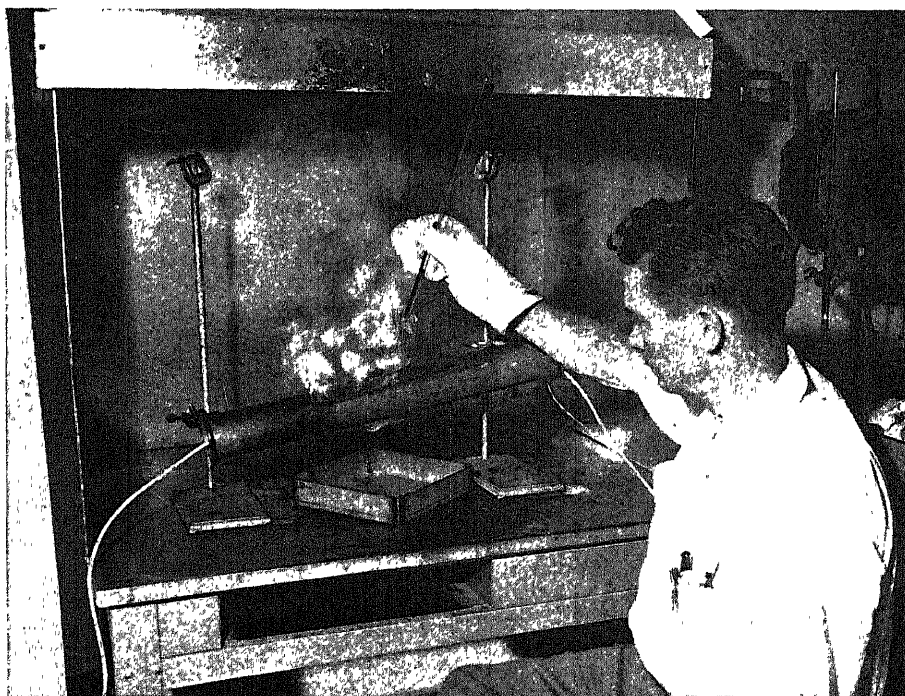
➤ DANGER OF FIRE in an airplane from leaking hydraulic fluids used to operate essential mechanism is practically eliminated by a new non-flammable type fluid revealed by Monsanto Chemical Company of St. Louis, in whose laboratories it was developed.

This new hydraulic fluid, to be known as Skydrol, is an ester base and contains no halogenated hydrocarbons, salts or water. Chemically, it is virtually inert. It will not attack the structural metals used in an airplane. It is a stable organic compound,

highly resistant to aeration oxidation. In addition, it has high lubricating power.

The hydraulic system of an airplane is operated by pumps, and develops high pressures at high flow rates upward of 3,000 pounds per square inch. The fluid is used to activate the mechanism that controls such devices as retractable landing gear, brakes, wing flaps and even windshield wipers.

It must be oily to lubricate the rapidly moving parts of the pumps, and non-corrosive to avoid attacking the various metals



NON-FLAMMABLE FLUID — Planes will be safer from fire with this new hydraulic fluid. Picture shows Skydrol dripped onto a glowing red tube of stainless steel, which is heated internally to a temperature of 1300 degrees Fahrenheit. It bursts into flame momentarily and then vaporizes.

in the hydraulic system. Also it must not undergo undue thinning at high temperatures and thickening at low temperatures. It should have low specific gravity to avoid undue weight to the plane.

Ordinarily, the hydraulic fluid is completely confined within the hydraulic system, which includes piping extending to

many parts of the plane. Occasionally, due in part to the high pressures used, the system springs leaks. A leak causes the fluid to be expelled as a fine spray. If it is flammable, it may catch fire from exhausts, from contact with the hot manifold, or from sparks from the plane's electric system.

Science News Letter, October 30, 1948

MEDICINE

Insecticide Cures Itch

► A PREPARATION made from an insecticide in a vanishing cream base may be the best cure yet found for scabies, popularly called "the itch."

It may also be effective in getting rid of lice.

Complete cures of scabies resulted in 61 patients after one treatment, in 36 patients after two treatments and in three patients after three treatments with hexachlorocyclohexane, Drs. A. Benson Cannon and Marvin E. McRae of Columbia University and the Vanderbilt Clinic in New York, reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 23).

The advantages of this preparation over the older ones such as sulfur and benzyl benzoate are that it produces no irritation or sensitivity to the drug and has proved effective in cases in which the other preparations have failed.

The physicians cite the case of a man who had a widespread persistent eruption of scabies for over four months. He was treated with sulfur ointment and benzyl benzoate without any relief. After one application of hexachlorocyclohexane cream the rash and itching disappeared.

Specimens of the itch mite were obtained from each patient to confirm the diagnosis. This was done by inserting a sharp needle into the beginning of the burrow made by the mite, a painless procedure as the burrow is confined to the horny layer of the

skin, and withdrawing the needle on the needle point.

The procedure then was to rub a thin film of the cream from the neck to the sole of the feet without allowing the patient to wash beforehand. After 24 hours he was allowed to bathe and was asked to use fresh underwear and night clothes and to change the bed linen. Members of his family were also examined and received treatment if they were infected.

Army medical investigators had previously found the drug important in the control of chiggers, ticks, fleas, cockroaches, bedbugs and lice. It was used as a spray on uniforms and in field fumigation.

Science News Letter, October 30, 1948

CHEMISTRY

Clicking Counter Warns of Poison Lead in the Air

► A DETECTOR for poisonous lead in the air that clicks madly in warning similar to a Geiger counter affected by radioactivity was announced to the Optical Society of America meeting in Detroit, by Henry Aughey, of the DuPont Experimental Station, Wilmington, Del., and O. G. Koppius of the Philips Laboratories.

Atmospheric contamination by lead is an acute problem in the chemical industry.

The new instrument can be carried about to test air wherever the danger of this accumulative poison exists. It is extremely sensitive and gives an approximate assay of the air in addition to detecting relatively high concentrations of lead, whether combined chemically or in its form as an element.

Suspected air is drawn through a spark discharge, the light from which is caught and split up by a quartz spectroscope. The tell-tale lines of lead are measured in two ways: Photographically or by substituting a photoelectric Geiger counter for the photographic plate. As little as one part in 20,000,000 of lead can be made to register as the warning counter clicks.

Science News Letter, October 30, 1948

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RADIO

Prints Radio Newspaper

A new communication system, called Ultrafax, can send a million words a minute, including illustrations, by television and radio relays.

► TELEVISION, radio relays and facsimile are combined in a new communication system called Ultrafax, demonstrated in Washington by the Radio Corporation of America. It reproduces in the receiving station a full page of printed or written matter with illustration, as is done by facsimile, but it does it at television speed, and it can send a million words a minute.

As explained by David Sarnoff, president of RCA, one possible development with Ultrafax is the exchange of international television programs achieved on a transoceanic basis. A service of television and Ultrafax would permit the same receiving set to bring various types of publications into the home without interrupting the program being reviewed. Special attachments to the television receiver would be required.

He pointed out the possibility of the establishment of great newspapers as national institutions and the instantaneous transmission and reception of complete editions in every home equipped with a television set.

The Ultrafax system, it was explained, combines the elements of television with the latest techniques in radio-relaying and high-speed photography. In regular service the transmissions could be radio-relayed any distance by using the commercial radio-relay system towers which are now being erected for television. They could cross the ocean by means of air-borne relay stations in airplanes traveling in lazy circles over properly spaced locations. It would be possible to have the same transmitter that broadcasts the television program simultaneously broadcast the radio newspaper.

Ultrafax's remarkable speed, RCA engineers explained, is possible because full pages of information are transmitted as television pictures at the rate of 15 to 30 a second. The steps in sending include the preparation of data to be transmitted, to assure a continuous flow at high speed, scanning the copy with what is known as a flying-spot television scanner, transmission of the television image as ultra-high radio-frequency signals, and reception on a projection-type television kinescope, or picture tube, from which incoming messages are recorded on motion picture film, or ultimately directly onto photographic paper.

At the end of the transmission, the exposed film can be transferred quickly to a special processing unit developed by Kodak Research Laboratories. The film is passed through a miniature developing tank, rinsed and fixed in less than 15 seconds and dried in 25 seconds more. The Ultrafax

film may be enlarged to full-sized copy by means of a high-speed continuous process machine.

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MEDICINE

Cures Reported from Cancer Battlefront

► HERE IS WHAT is happening on the national cancer battlefront, as reported to the American College of Surgeons meeting in Los Angeles.

There were 343 patients cured of cancer and 132 who survived over a five-year period at The Tumor Clinic of King County Hospital, Seattle, Washington, according to Dr. Donald V. Trueblood, director.

Twenty-five out of 49 victims of cancer of the breast were cured over a five-year period, 34 out of 77 with cancer of the neck of the uterus and 22 of 38 with cancer of the body of the uterus, at the Tumor Clinic, Emory University Hospital in Atlanta, Dr. J. Elliott Scarborough, Jr., reported.

Of 244 patients with cancer of the large intestine on which follow-up work was done, 122 survived five years or longer at the Scott and White Clinic, Temple, Texas, Drs. George V. Brindley and R. R. White indicated.

"During a 12-year period, 4,000 patients were cured of cancer at the Veterans Administration Hospital, Hines, Illinois," according to Drs. Charles B. Puestow and Joseph R. Hufschmitt, and Philipp W. Zinkgraf.

The five-year survival rate in six upstate New York counties based on study of all cancer cases reported from 1940-1944 is 26%, data presented by Dr. Frederick S. Wetherell, of Syracuse Memorial Hospital, shows.

"A good deal of statistical evidence is now available which indicates that the curability of cancer is increasing year by year," Dr. Edward J. Ottenheimer of the Windham Community Memorial Hospital, Willimantic, Conn., told the cancer symposium.

In the seven-year period, 1935 to 1941, there were nearly 13,000 cases of proved cancer in Connecticut. "The increase in five-year survivals since 1935 ranged from 9% to 37%," he stated. "This striking change has not been confined to cancer of any particular organ, but applies in different degrees to cancer of every important site as well as to the total group."

Science News Letter, October 30, 1948



NEW NURSING BOTTLE—The mother is shown feeding the baby out of a new collapsible, disposable nursing bottle that requires no washing or sterilizing.

INVENTION

New Plastic Nursery Aid Eases Feeding of Babies

► IT WILL BE "Shellie-fed" instead of bottle-fed for modern babies whose mamas do not breast-feed them, if the hopes of inventor and producers of the newest nursery aid, called Shellies, are fulfilled.

The baby will get his formula from a collapsible bag that can be thrown away after use. Soft and cuddly Shellies, with their specially designed nipple, are said to give the baby much the feeling of security and warmth that breast-fed babies get while nursed by their mothers. Because the bottles are collapsible, there is no back-pressure, no air for the infant to swallow and consequently less need for "burping."

Shellies were invented by a registered nurse, Mrs. Adda May Allen, of The Plains, Va. They are produced by the Shellmar Products Corporation of Mount Vernon, Ohio. They are about to be placed on the market, on a regional basis at first, and will be available at drug, department and infant specialty stores throughout the nation "reasonably" soon, the manufacturers of the plastic bottle announced.

Shellies come in a long roll, each bottle sealed off from the next in line. They are already sterilized and since each is thrown away after its use, bottle washing and sterilizing are eliminated. They will cost about one cent apiece, but to use them mothers will also need a bottle expander, bottle rack, aluminum inner rings, plastic outer locking rings, special "natural-action" nipples and plastic shell caps to protect the

nipples until use. Price of the entire outfit has not yet been set.

Saving in storage space is an added advantage pointed out by the manufacturers.

One hundred empty Shellies take up less space than one four-ounce glass bottle. And they will not break or burst even when dropped on a hard surface.

Science News Letter, October 30, 1948

PALAEONTOLOGY

Near-Human Pygmy Race

➤ AFRICA once had a pre-human race of pygmies—or near-pygmy—who lived in caves, knew the use of fire, and used big bones of game animals as clubs in hunting and fighting. Their average weight was probably under 100 pounds, yet they had brains as big as modern gorillas weighing four or five times that figure.

This description of a “new,” although long-extinct, race of human (or near-human) beings sums up three years’ work by scholarly pick-and-shovel men under the direction of Prof. Raymond A. Dart of the University of the Witwatersrand, Johannesburg, South Africa. He presents his findings in detail for the first time in the *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY* (Sept.).

Crucial find in establishing the identity of this race of little near-men was a broken piece of skull, representing a considerable section of the bulging back portion of the cranium. It has definite human characteristics, Prof. Dart declares.

In the same cave were many bits of charcoal embedded in the solidified debris, together with some bones that were also charred—strong evidence of the use of fire. Baboon skulls, always broken as by a heavy

blow, he takes as evidence that the cave-dwellers were meat-eaters and hunters. Ends of long bones of animals are battered, as if used for clubs.

The new find belongs in the same general group to which the name *Australopithecus* was given some 25 years ago. The long word translates into English as “southern ape,” because when the first fossils were discovered, and for a considerable time after that, it was thought that they were apes with some human characters, rather than small, highly primitive men. However, declares Prof. Dart, every find of *Australopithecus* that has been made since has tended to push him further away from the apes and closer to human status. In this, he adds, several other researchers on ancient man agree with him.

Because the newly found skull fragment appears to be quite distinct from the *Australopithecus* types hitherto known, Prof. Dart considers it to represent a distinct species, and he has accordingly given it a new name: *Australopithecus prometheus*. The second or specific name is that of the hero of ancient Greek mythology who first taught men the use of fire, and is a reference to the traces of fire found in the cave.

Science News Letter, October 30, 1948



CELLS IN THE MOUTH—Here is the way the cells which form the skin of your mouth would look in a photograph taken with the ultraviolet phase microscope. These epithelial cells are greatly magnified.

PHYSICS

Phase Microscope and Ultraviolet Spy on Cells

➤ LIVING CELLS will be spied upon in more detail than ever before through the extension of phase microscopy into the ultraviolet.

Ultraviolet photographs made with a phase microscope, which takes advantage of the fact that light travels in waves to bring out details without preliminary staining, were sharper than those made with visible light.

More details show up in the ultraviolet photographs of cells from the skin in the mouth than were visible in previous pictures, report A. H. Bennett, D. L. Woernley and A. J. Kavanagh of the Scientific Instruments Division, American Optical Company, Buffalo, N. Y. This instrument shows great promise, they state in the *JOURNAL OF THE OPTICAL SOCIETY OF AMERICA* (Aug.).

The ultraviolet phase microscope, first of its kind to be reported, incorporated a filter that produced a rather broad band of ultraviolet radiation and another band extending into the near infra-red. The photographic film was such that it picked up only the ultraviolet radiation.

Science News Letter, October 30, 1948

Man is not the only animal that makes hay in the summer; the rabbit-like *cony* of the Rocky Mountains cuts grass and other plants and, after they have dried in the hot sun, carries the hay by mouthfuls to his den for winter food.

MEDICINE

Diet Is Aid in Liver Ill

➤ A DIET rich in protein, supplemented with vitamin B complex, improved the health and prolonged the life of patients with cirrhosis of the liver, which is often the result of overindulgence in alcohol.

Traditionally, the diet prescribed for liver disease is one that is high in carbohydrate but low in protein and fat. This study was made to contrast the results between 124 patients treated with the new diet and 386 patients treated with the traditional diet, and appears in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Oct. 23).

The work is reported by Drs. Arthur J. Patek, Jr., Joseph Post, Oscar D. Ratnoff and Harold Mankin, and Robert W. Hillman, of the Goldwater Memorial Hospital and the College of Physicians and Surgeons, Columbia University.

In 61 patients of 115 (nine not having been followed long enough) the unsightly accumulation of fluid in the abdomen disappeared, as did the jaundice and swelling, there was a gain in weight and strength and improvement in liver function.

At the end of one year, 65% of the

patients treated with the new diet were alive and only 39% of the control group studied for contrast; at the end of two years, 50% of the treated patients and 21% of the controls were alive, and at the end of five years 30% of the treated patients and 7% of the controls were alive.

The scientists chose a diet rich in protein and ample in carbohydrate and fat for these patients because there were signs of malnutrition. Ninety-one patients, they found, had lived on poor diets mainly deficient in meat and dairy products.

Twelve patients furnished further proof that this dietary treatment was effective. After recovery following treatment, they fell into their former drinking and poor eating habits. Relapse of their former condition followed. “In effect, they reproduced the conditions of the experiment,” the scientists point out. “The fact that these 12 patients responded well to the same treatment on two or more occasions suggests that improvement resulted from treatment and that it was not ‘spontaneous.’”

Science News Letter, October 30, 1948

PHYSICS

New Magnetic Particle

When and if discovered, this subnuclear particle may help explain why all electrons carry the same unit amount of negative charge, physicist predicts.

► A NEW subnuclear particle, this one bearing a magnetic charge instead of the more familiar plus or minus electrical charge of the proton or electron, has been predicted.

The new particle has yet to be observed in the laboratory, since its generation by an artificial atomic collision would require energies greater than provided by any present atom smashers. Neither has it been observed in cosmic ray studies, probably because no one was looking for it.

The description of the new magnetic particle, in a very technical article in *THE PHYSICAL REVIEW* (Oct. 1), comes from Dr. P. A. M. Dirac, the British mathematical physicist now working at the Institute for Advanced Study in Princeton, N. J.

Prof. Dirac once before, in 1931, predicted the existence of and properties for an unknown particle. That particle was the positron, and it was then actually discovered about a year later in a cloud chamber photograph by Dr. Carl D. Anderson of the California Institute of Technology.

Why add a new particle to the present long list, especially when the particles now known are so incompletely explained? Prof. Dirac raised that question, and then answered it by saying that the new particle is needed for theoretical reasons. It is needed, he said, in order to help explain why all electrons carry the same unit amount of negative charge. That electric charges, such as those on the electron, pro-

ton or meson, do occur in even multiples of the same electronic unit charge has been known experimentally for a long time. Still, there has been no adequate explanation of this even-multiple type of regularity.

Prof. Dirac now surmises that there is no explanation for the regularity apart from the existence of magnetic particles on the subatomic level. Moreover, if there exists even one of these particles in the universe, this theory requires all electric charges to be even multiples of the electronic charge.

The particle could be created in an artificial collision having an energy of 500,000,000 electron volts, it is estimated. This puts it out of range of even the 184-inch cyclotron at Berkeley, Calif., with its 400,000,000-electron-volt particles, which artificially created mesons. Thus, for the moment, search for such a magnetic particle will have to be made through cosmic ray studies, until the billion-volt generators are completed.

What will it look like? In a cloud chamber, it should give a heavy track of uniform density through its path. This will help distinguish it from such tracks as those of alpha particles, which get denser as the particle slows to a stop. Also, in a strong magnetic field, the new magnetic particle should be deflected toward one of the poles, instead of running in circles as electrons and protons do.

Science News Letter, October 30, 1948

MEDICINE

Mass Survey for Diabetes

► A MASS SURVEY to detect unsuspected cases of diabetes, aided by a new quick test for sugar in the blood, will be conducted throughout the nation by medical societies and public health authorities during National Diabetes Week, Dec. 6 to 12.

Object of the survey, which will be sponsored by the American Diabetes Association, is to help those who do not know they have the disease to get treatment for it before they get seriously sick with the disease or its complications.

There are 1,000,000 known and 1,000,000 unknown diabetes victims in the United States, Dr. Priscilla White of the Joslin Diabetes Clinic, Boston, reported at a conference in Washington. These figures are based on surveys already conducted in Oxford and Brookline, Mass., and Jacksonville, Fla.

A new kind of insulin, declared by Dr. White to be the "best yet available," is now under trial at the Joslin Clinic and elsewhere. It is known as NPH 50. It is not yet on the market and will not be until production of a uniform product on a large scale is worked out. It is a crystalline protamine insulin. Previous protamine insulins have been amorphous, or non-crystalline. The new insulin combines speed of action with long lasting effects. With the older insulins, a dose each of a fast and of a long-lasting one must be given. This means either two injections or measuring and mixing two doses for a single injection. The new insulin is a one-shot job. It takes effect in two hours and lasts 28 hours.

The new fast test for sugar in the blood, to be used in the mass survey along with tests for sugar in the urine, was developed by scientists of the U. S. Public Health

Service. It can be done with a few drops of blood from finger or ear, and takes only five minutes. It is considered a screening test only, and those whom it shows to be probably diabetic will be referred to their doctors for further tests to make certain whether or not they have diabetes.

The reason for two tests, Dr. White explained, is that some persons may have sugar in the urine without having diabetes.

Science News Letter, October 30, 1948

PHYSICS

Uranium Can Be Detected By Spectral Analysis

► VERY SMALL amounts of the atomic energy atom, uranium, can be detected by a new method of spectral analysis reported to the Optical Society of America meeting in Detroit by Dr. L. T. Steadman of the University of Rochester.

Expected to be of use in measuring uranium present in many sorts of materials, the sample is burned in the crater of an electric carbon arc and the light given off is split into its spectrum lines by a quartz spectroscope. The brightness of the uranium lines measured shows the amount of the metal present.

Science News Letter, October 30, 1948



GIANT BIRD BABY—This condor boasts a weight of 19 pounds and 8 ounces—and it's only 13 weeks old. It is the first female Andean condor ever to be born in captivity and it is at the Zoological Gardens of San Diego. When it grows up it will weigh 20 to 25 pounds and have a wing spread of 7 to 9 feet. Condors are not only the largest birds of prey but also the largest land birds of flight.

PUBLIC HEALTH

Aid Found to Protection Against Lead Poisoning

➤ A NEW AID to protection against lead poisoning was announced by Dr. Lall G. Montgomery and Everett Johnson of Muncie, Ind., at the meeting in Chicago of the American Society of Clinical Pathologists.

People who have been exposed to lead, as in certain industries, excrete through their kidneys more than the normal amount of certain pigments called porphyrins, the Muncie scientists found.

Among college students, student nurses and employees of an industrial plant in which there was no measurable lead exposure, less than 2% excreted more than normal amounts of these pigments. Among employees of industries in which variable amounts of exposure to lead were possible, 34% excreted more than the normal amount of porphyrins. Several patients with lead poisoning all excreted increased amounts of the porphyrins.

The porphyrin excretion, by giving an index of exposure to lead, might help prevent lead poisoning by showing which employees were in danger and needed to change their work and also which spots in industries needed extra protective measures to reduce the exposure to lead.

Science News Letter, October 30, 1948

BIOLOGY

Quickest-Maturing Animals Produce Most Offspring

➤ THE SOONER they mature the more offspring they have. This principle, demonstrated in laboratory animals by Drs. Harold H. Cole and Robert B. Casady of the University of California College of Agriculture in Davis, Calif., will be of obvious practical importance if it is found to hold good in farm animals, they point out.

The two scientists used two inbred strains of rats in their research. One strain, developing to maturity at an average age of 36 days, produced 8.9 young per litter. Rats of the other strain, which required as much as 42 days to reach maturity, produced litters averaging only 6.5 young.

General application of this principle in chickens and turkeys has already been demonstrated by other researchers.

Science News Letter, October 30, 1948

MEDICINE

New Operation Overcomes Paralysis of Vocal Cords

➤ PARALYSIS of the vocal cords can be overcome in some cases by a new operation devised by Dr. William C. Thornell of Cincinnati.

Dr. Thornell reported his operation to the American Academy of Ophthalmology

and Otolaryngology meeting in Chicago. He explained that it is for cases in which the vocal cords have become paralyzed because of nerve damage that sometimes happens during operations in nearby parts of the neck.

In these cases the patient has trouble breathing, develops a shrill "crow" in trying to breathe, and may lose his voice entirely.

Former operations to correct the condition were done from the outside of the throat and patients often had to wear a tube through the front of the neck to the windpipe to breathe.

Dr. Thornell operates from inside through the mouth. He removes a tiny cartilage from the tissue supporting the vocal cords. This lets one cord pull aside by its own tension. The air-way is then opened and the patient can breathe normally without the tube from the outside of the throat.

Normal breathing was fully restored in three patients and two of them, he reported, found their voices much improved.

Science News Letter, October 30, 1948

MEDICINE

Facts on Nervous System May Come from Antibiotic

➤ STREPTOMYCIN, the mold chemical which has been rescuing thousands of persons from germ diseases, may give the most important addition to understanding of a certain part of the nervous system that has been made in the past 100 years. This by-product value of a famous germ-fighting chemical was suggested by Capt. Page Northington, U. S. Navy, at the meeting of the American College of Surgeons in Los Angeles.

Capt. Northington was studying the effects of streptomycin on the eighth cranial nerve. Part of this nerve is concerned with hearing and part with equilibrium, or balance. It is the nerve which is involved in Meniere's disease. Some patients, usually those getting large doses of streptomycin, have suffered damage to this nerve. They have ringing or noises in the ears and walk with a drunken gait.

The main site of damage, Capt. Northington believes from his studies, is not in the nerve and not in its end organ in the brain, but in the "vestibular nuclear complex and adjacent cochlear nuclei" of the internal ear.

If this is confirmed by further studies, a correlation of this information along with clinical examination and functional ear tests should provide some specific knowledge of deafness and tinnitus, or ringing in the ears, of central origin. It would also provide "the most important addition to understanding the functional organization" of the nervous system of the vestibular part of the ear "since original observations on the peripheral components were made by Flourens and Meniere 100 years ago."

Science News Letter, October 30, 1948

IN SCIENCE

ENGINEERING

Fiber Glass Boats to Be Tested by the Army

➤ GLASS BOATS are to be tried out by the Army. They will not be transparent like ordinary glass; they will be made of fine glass fiber, matted or woven together and impregnated with a plastic.

The boats will be of the assault type, powered by an outboard motor, and large enough to carry a dozen or so soldiers. One advantage is that they will weigh only three-fourths as much as present aluminum boats; also they have great strength.

Construction is simple. A one-piece boat can be made, using an inflated rubber bag against a mold of wood, gypsum, steel or aluminum over the sides of which the fiber glass and plastic mixture has been spread. The inflated bag gives the necessary pressure. The temperature required is from 225 to 325 degrees Fahrenheit. The manufacturing process is similar to that employed in making fiber glass wings for airplanes.

These boats will never need painting. Coloring matter is included in the plastic used, which is an alkide resin adhesive. Even scratches in the finish will not show. Field repair can be effected with a hot patch. The fungus-proof material has high impact resistance and does not warp with temperature changes.

Science News Letter, October 30, 1948

ENGINEERING

Magnetic Particles Reveal Flaws Inside Metal Tubes

➤ MAGNETIC iron oxide particles, fluorescent lights, a mirror and a surveyor's telescope are being used to detect tiny flaws on the inside surfaces of holes bored in long metal forgings. The process is a laboratory technique and is not for commercial uses.

This flaw-detecting method, in use in laboratories of the General Electric Company, can indicate flaws one five-hundredth of an inch wide in a boring 35 feet long. It involves magnetizing the forging and then blowing the iron oxide particles down the hole.

These particles align themselves with the north and south magnetic poles of any cracks or flaws which are present. Then a small cylinder on which three fluorescent tubes and a small mirror has been mounted is slowly drawn through the hole. The surveyor's telescope is used to view the mirror. Flaws in the forging, being outlined by the iron oxide particles, are visible.

Science News Letter, October 30, 1948

E FIELDS

GENERAL SCIENCE

Rocket-Borne Cameras Snap Large Section of Earth

See Front Cover

► PICTURES covering the largest section of the earth ever to be photographed at one time were recently taken from a V-2 rocket. It was shot up about 60 miles above the White Sands, New Mexico, Proving Ground, and from it were photographed about 800,000 square miles of the earth.

Two other rocket-borne cameras were installed in a Navy Aerobee which zoomed to a height of about 70 miles and photographed about 300,000 square miles.

Each camera took more than 200 photographs at one and one-half second intervals.

At almost the peak of the Aerobee's flight, altitude 57 miles, the curvature of the earth and the surface haze can be plainly seen as shown on the cover of this week's SCIENCE NEWS LETTER.

The Aerobee rocket photographed a strip 1,400 miles in length, stretching from upper Wyoming on the north to deep into Mexico on the south. The width of the area photographed ranged from 45 to 400 miles at the horizons.

Scientists of the Applied Physics Laboratory of the Johns Hopkins University in Silver Spring, Md., cooperated in this project with the Navy Bureau of Ordnance.

Science News Letter, October 30, 1948

GEOLOGY

Coral Reefs May Add to Petroleum Supply Some Day

► CORAL REEFS in distant waters may some day contribute to the petroleum supply—but not in time to help present shortages. It will be crude oil for future eons which may be hundreds of thousands of years from now.

It is the tiny animals that form coral reefs that are manufacturing the petroleum drop by drop, the American Chemical Society was told in Cambridge, Mass., by Prof. Werner Bergmann of Yale University. Stony coral, he said, contains minute amounts of a wax-like substance which apparently becomes entrapped in the ever-growing reefs.

It would require only a relatively minor geological change to bring about a disintegration of the reef, and only a slight rise in temperature to liquefy the waxy material and bring it together.

It is not inconceivable, therefore, that some coral reefs of a very distant past have

contributed to the formation of present-day petroleum, and that present reefs, such as the Great Barrier Reef near Australia, are accumulating material for the formation of petroleum in a very distant future.

The wax, which makes up about one-seventh of one percent of the coral, consists largely of hydrocarbons and complex alcohols, chemicals similar to those in petroleum.

A ten-year study of more than 100 different species of lower forms of marine life has revealed that the fats of sea-dwelling animals contain an unusually high amount of unsaponifiable fats, or fats that can not be converted into soap by treatment with caustic alkali. As a rule, he stated, the more primitive the animal, the higher percentage of unsaponifiable material in the fat. This is an important fact, the biochemical significance of which is not yet clear.

Science News Letter, October 30, 1948

PHYSICS

Spectrum Analyzer Aids Study of High Energy Rays

► A GIANT spectrum analyzer, used to determine how energy is distributed in the beam of X-rays from a 100,000,000-volt betatron, powerful atom-smasher, was revealed by General Electric physicists.

It is an eight-ton, scientific, labor-saving device which yields in a few months data that would take many years to acquire by older methods. The development was made by Dr. James L. Lawson, G. E. staff, and sponsored by the Office of Naval Research. The instrument is called a gamma ray spectrum analyzer.

The radiation produced by the powerful betatron is not uniform, but consists of a mixture of rays of various energies, Dr. Lawson explained. Accurate experimentation requires that the distribution of these energies be determined with precision.

This involves the secondary effect of pair formation, by which energy is literally converted to matter. The X-ray is changed to an electron, which has a negative charge, and a positron, similar but positively charged. In a magnetic field these particles are curved in opposite directions. Their curvature in a known magnetic field indicates the energy of the original X-ray. X-rays of high energy produce particles of correspondingly high energy, and these are bent less than those of low energy.

In Dr. Lawson's device, the X-rays hit a thin metal target where the electron-positron pairs are formed. These pass through a vacuum chamber in the field of a powerful electromagnet. They are then detected as they fall on a battery of 100 Geiger counters. Information from the counters is carried to a bank of registers. These show directly the spectrum, that is, the intensity of the beam at each particular voltage.

Science News Letter, October 30, 1948

BIOLOGY

Male Sex Cells Needed For Fertilization Counted

► HOW MANY spermatozoa—the motile male sex cells—are necessary to insure the fertilization of one egg and thus start a new life?

An answer to that question is now of great practical importance, with the development of artificial insemination in the livestock industry. Dr. C. R. Austin, of the National Institute for Medical Research in London, reports an effort to find it experimentally, in the British scientific journal, NATURE (Oct. 2).

For essential biological purposes, of course, only one male cell needs to penetrate the egg, so that its nucleus can bring about fertilization. However, it seems probable that a certain amount of a chemical compound known as hyaluronidase, supplied by the male, is needed to enable that one necessary spermatozoon to pass through the egg's covering membrane. With this quantity, some excess of the male fertilizing fluid seems to be required, containing large numbers of sex cells.

Rabbits and rats were used in Dr. Austin's experiments, because of their small size and low cost; but principles thus determined are indirectly applicable to larger animals. He found that a rat egg could be fertilized when less than one hundred male sex cells were present. In the rabbit, fertilization seemed to require the presence of a thousand spermatozoa.

Science News Letter, October 30, 1948

INVENTION

Microphone Clamps on Nose To Cut Outside Noises

► A TINY microphone that clamps on the base of the nose like a pair of pince-nez glasses is the newest aid for communications in noisy places like boiler-shops or engine-rooms of ships. It is the joint invention of William R. Blair of Washington and Albert E. Woodruff of Oak Park, Ill., to whom U. S. patent 2,451,317 has just been granted.

Reason for its use is that when an ordinary microphone is employed in such noisy places it picks up and amplifies the noise as well as the speaker's voice and thus makes the bedlam worse than ever. By clamping the microphone against the nasal bone, it is possible to eliminate the air gap and thus keep out the external noises, while it picks up the speaker's words by bone conduction.

The apparatus is held steady by a light head-band, and the light wire connection to the amplifying set leads back over one of the user's ears.

Patent rights have been assigned to Automatic Electric Laboratories, Inc., of Chicago.

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PSYCHOLOGY

What Sways the Voter

Some are greatly influenced by family and friends, while others vote according to political tradition. These are the uncertain few at whom political campaigns are aimed.

By MARJORIE VAN DE WATER

► HOW WILL you vote on election day?

If you are like the majority of American voters, you already know. Maybe you knew last May even before the candidates were nominated. Before Wallace started a third party. Before the Dixiecrats first organized.

All the flood of impassioned campaign oratory you have been listening to, the newspaper editorials, the television programs, the handbills and airplane sky writing have not actually changed many votes.

What the campaign propaganda has done, mostly, is to make the Truman supporters more enthusiastic about their choice and to make the Dewey fans more than ever determined to put a Republican president in office. And that is important. The voter likes to be bolstered in his political faith. He likes to know that others think as he does. And he likes to be provided with good logical reasons for his beliefs.

About half the voters, in general, know how they are going to vote long before the formal campaign opens. But there are a few who do not make up their minds until the morning of election day, or who change their minds—perhaps several times—before the moment arrives to drop the ballot in the box.

Uncertain Voters

Those few—the uncertain, the “independent voters,” the fickle who change with the weather—those are the ones to whom all the high pressure campaign “salesmanship” is directed.

Why are some uncertain? What causes a man to change his vote? Repeated interviews with voters during the months before presidential elections have provided the basis for a psychological study of this.

The uncertain voter is likely to be the man who is driven by various pressures working at cross purposes, it was found in one study conducted by Dr. Paul F. Lazarsfeld of New York and his associates. Their findings are described in a new book, *THE PEOPLE'S CHOICE* (Columbia University Press).

The man in this election, for example, who has always voted the straight Democratic ticket and who has always been a firm defender of states' rights, found himself faced with a difficult decision when Truman was nominated.

In other cases, political traditional choice may conflict with religious prejudice or either may interfere with a desire to elect a man from a favored part of the country.

People are greatly influenced by their family and close friends. But sometimes there is disagreement among these so that a person may be persuaded in one direction by a brother and in the opposite way by a friend.

In fact, whether you vote for Truman, Dewey, Wallace, Thurmond or Thomas, the chances are you will do so because you have always been a Democrat, Republican, “liberal,” Southerner or Socialist or else because your family, friends or the members of an organization you belong to plan to vote the same way.

That is what Dr. Lazarsfeld found in his intensive study of voters in Erie County, Pa.

Campaign Speeches

If you listened last night to a campaign speech, and were influenced by what was said, it was probably because you were already prejudiced in favor of the speaker. If you were prejudiced strongly against the candidate when you tuned in the station or went to the auditorium, it is likely that you came away even more strongly determined to vote against him.

So you are a much better campaigner for your favorite candidate than is the candidate himself.

Suggestions dropped at the family dinner table, or by a neighbor over the back fence or in the grocery are much more likely, it seems, to swing a vote at the last minute, than is the carefully planned election propaganda.

Voters are also influenced more by the personality of the man running for President than by other party action. Dr. Lazarsfeld questioned voters who had waited until after the party conventions to make up their minds how to vote. Only a few said that they made their choice on the basis of the party platform. Not many were swayed one way or the other by the choice of vice-presidential nominee.

If you think of the election as a great national drama in which the actors include all the voters, then it is the candidate for President who is the leading star—the hero of the play.

And that is, actually, the psychological mechanism employed by the wise political strategist, according to Robert C. Myers, social psychologist of Princeton University.

Not only in his speeches but in all the activities of the campaign, the handshaking, baby kissing, the tours of the grassroots—the successful campaigner tries to get the voter to think of him as the great lover of

the people. This naturally puts each voter into the part of the other lead, the lady in distress who, if she only puts her trust in the candidate, will be saved from danger and evil.

The villain? The campaigner is sure to pick at least one. Preferably it is one that the voters already hate and fear. It may be capitalism, communist labor organizations, bureaucracy, war, interference with individual rights, boss politics, Russia or dreamy idealism.

Psychological Aspect

Next step in the psychological vote gathering is to identify the political opponents with the appropriate villain in the minds of the voters. This is the name-calling, mudslinging aspect of campaigning. It is an important part because hate is fluid; it can easily be diverted from one object to another through this kind of association. If the political leader can succeed in causing the voters to hate his opponent, he may win because it is very common for people to vote against the candidates they dislike rather than voting for anyone.

But if the campaigner is not skillful, he can work himself into a pretty predicament in this way, Mr. Myers points out. He has cast the voter in a role that is not very



PRESSURE CAMPAIGN—Badges and buttons, displayed by a dealer in Americana, are a part of the traditional campaign. They may help swing votes—if they are worn by the right people.



PERSUASIVE ARGUMENTS—A "bull session" may swing more votes than a campaign address. Your vote tends to be influenced more by friends and relatives than by the candidates' oratory.

active. He may have too much faith in the leader. He may be too sure that his favorite will win and thus save the day. He may just stay home on election day and not vote at all.

The "band-wagon" appeal may now be brought into play. It is a characteristic of the American voter that he likes to be on the winning side.

But all of the appeals of the experienced and talented campaigner may pale into insignificance in the face of some moving world event.

If America is plunged into war on the eve of election, it could change thousands of votes. The choice of a war leader might be entirely different from the person voters would pick to handle pressing domestic problems, avert an economic depression, "crack down on labor," or reduce taxes.

A break in the stock market bringing a great business depression is usually the cause of great swings in the political tide. These ups and downs of public sentiment have been charted by Louis H. Bean, statistician of the U. S. Department of Agriculture, who, more or less as a hobby, has made a specialty of predicting elections. He found a clear relation between the business cycle and the political cycle.

A business crisis is more important in swinging votes than an international crisis, he found. That is because a depression affects voters all over the country alike. The international crisis is likely to cause division among the voters and raise issues which separate East from Midwest, for example, or one group from another. Dr.

Bean reports his studies in *How to Predict Elections* (Knopf).

Economic bad times work to the disadvantage of whatever political party is in power at the time. The League of Nations issue is generally held responsible for the defeat of the Democrats in 1920, but Mr. Bean considers that the fact that the prices farmers received for their products had declined 20% between May and election day, was certainly a major factor.

Franklin D. Roosevelt was a depression-created President, Mr. Bean points out, and the New Deal began to wane in popularity with the decline in business activity and agricultural prices in 1938. Harding, McKinley and Cleveland in 1884 were also depression elected.

Influence of Calamities

Droughts and other natural calamities are also likely to bring about a change in the political point of view. Whenever men are unhappy or in distress, the natural tendency is to want to change things. It is not possible to change the weather at will, but you can change your vote and hope for better days.

But whoever you vote for, when election day is over you are likely to find that you and all your neighbors are more favorably disposed toward the man who wins. If you voted for him, you will be more staunch than ever in his support. If you were uncertain whether to vote for him or not, you will probably be won over. If you voted against him, you will be less down on him than you were during the heat of the cam-

"The whole world is queer except thee and me, and sometimes even thee seems a little queer"

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and Winifred V. Richmond, B.S., A.M., Ph.D.

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Do You Know?

The dusky *salamander*, the most common type along streams in the eastern part of the United States, lays from 20 to 40 eggs beneath a stone near a spring and stays with them for two months until they hatch.

Frederick the Great is said to be responsible for promoting *potato culture* in Prussia; a little over two centuries ago he had seed potatoes distributed free and compelled the peasants to cultivate them.

In making *asbestos cloth*, a certain amount of cotton fiber is often used to give a firmer construction; the fireproof asbestos fibers are slippery and do not hold together as well as when a cotton mixture is used.

Gasoline vapor, found in some natural gases, is recovered in tall slender towers called absorbers; in these, oil trickling downward is encountered by the gas-gasoline mixture and the gasoline is thus salvaged.

Dairies have used sound waves, too rapid for the human ear, to homogenize milk; they shake up the milk so violently that the fat globules blend themselves with the water globules in such a way as to be not easily separated.



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MEDICINE

Greater Hope for TB

➤ GREATER HOPE is now held by medical authorities that tuberculosis of the bones and joints and genitourinary tract will be improved by streptomycin treatment.

In the future, also, there may be fewer undesirable reactions to the drug since it has been found that the daily dosage can be cut in half without affecting the results.

These conclusions were contained in the second annual progress report on the effects of streptomycin treatment in all types of tuberculosis which appeared in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 23). Dr. Austin Smith, secretary of the Association's Council on Pharmacy and Chemistry, states that the conclusions are based on a study made of 2,780 patients with all types of tuberculosis treated with the drug since June, 1946. The Veterans Administration and the Army and Navy have cooperated in this investigation.

Types of tuberculosis and their response to treatment are as follows:

In 943 patients with tuberculosis of the lungs 77% to 83% showed improvement. Moreover, 75% of the patients who were becoming worse prior to streptomycin treat-

try its stability, psychologists believe. It is what makes it possible for us to go on having hotly contested elections and then, after all the bets are paid off, settling down to business again satisfied with the result.

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ment, improved during treatment, "a reversal in trend which is regarded as especially significant," according to the report. The improvement, however, is partial and only rarely complete and there is a high rate of relapses, Dr. Smith points out.

In 112 patients with involvement of the windpipe and its branches, and 166 patients with tuberculosis of the larynx or voice organ, there was from 80% to 90% improvement. These two types "compose one of the most favorable fields for streptomycin therapy," Dr. Smith states.

In 368 patients with TB-produced open sores and ulcers of the skin, nearly four out of five, or 78% of the sites of infection were healed.

In 192 patients with TB of the bones and joints, 91% showed improvement in that there was a reduction in inflammation, pain and swelling.

In 112 patients with TB of the genitourinary tract, there was an 80% improvement.

Favorable results were also obtained in small numbers of patients with TB of the alimentary tract, TB of the lymph glands, peritonitis, and inflammation of the middle ear.

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MEDICINE

Drug Relieves Gas Pains

➤ ONE of the common distressing after-effects of operations, abdominal distention, or "gas pains," can be prevented or quickly relieved in many patients by a chemical called urecholine.

The good results with this medicine were reported by Dr. Clarence E. Stafford of the College of Medical Evangelists School of Medicine and Drs. Alexander Dederer and Arthur I. Kugel of Los Angeles at the meeting of the American College of Surgeons.

About half of a group of 41 patients had good results from lozenges of the drug put under the tongue three times a day, and another third so treated had only slight or moderate discomfort from distention or cramping. Some of those who got no relief when the drug was given under the tongue were then given a small dose by injection into the skin. This brought relief within about five minutes.

The drug must not be given by injection into the muscles or veins, the doctors cau-

tioned, because then it may cause a drop in blood pressure and collapse. The dose, they also pointed out, should be adjusted for each patient.

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Don't Get "Stuck"!

Read "How to Be an Expert Car Buyer", the sensational new 96 page book sweeping the country. It can save you hundreds of dollars. Covers 36 tricks used to defraud new and used car buyers; fair prices and trade-ins; fair financing and insurance; operating and repair costs; how to spot a "lemon"; stolen cars; etc. Mr. R. J. Schmunk, Pres. AAA, states: "Even a hasty reading of your valuable book should prevent most people from falling into the most obvious mistakes." A copy should be in every American home. On sale at Macys, New York; Gimbel's, Phila.; Marshall Field, Chicago. Only \$1; COD \$1.18. Cummings Enterprises, Keystone State Bldg., Phila. 7, Pa.

OPHTHALMOLOGY

Sight Restored by Rays

➤ BETA RAYS from radium or radon are giving results "unobtainable by any other method" in restoring eyesight lost through scarring of the cornea, Dr. William H. Boyd of Los Angeles reported at the meeting of the American College of Surgeons.

The use of X-ray or radium treatment around the eye has been discouraged for years because of danger of cataract formation. This danger, Dr. Boyd finds, has been over-rated.

Patients whose eyesight improved under beta ray treatment were those whose corneas were scarred either through injury or

as a result of syphilis. Scarring of the cornea due to faulty nutrition was not much helped.

The cornea is the transparent outer covering in front of the eyeball. When it is scarred, light cannot get through and eyesight is impaired. Microscopic study of such scarred and thickened corneas showed that the layers of cells making up the cornea had increased in number and the cells had changed in shape. The ray treatment resulted in a decrease in numbers of cell layers and a tendency for the cells to flatten back to a shape resembling the original one.

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MEDICINE

Urge Early Child-Bearing

➤ SUBSIDIES to make early marriages possible for young people of superior intelligence and education, especially the young women, is the unique prescription for disease prevention offered by Dr. Joe Vincent Meigs of Boston, to the American College of Surgeons meeting in Los Angeles.

The particular disease to be prevented in this way is one peculiar to women. It is called endometriosis and is a condition in which the lining tissue of the uterus is found not only inside but outside the uterus and sometimes on nearby organs. Pain and menstrual disturbance are among the symptoms. The condition may lead to sterility either through its effects on child-bearing organs or through operations necessary to relieve it.

The disease appears at about the age of 26 years. It is so much less common among poor women who marry and bear children at an early age than among women of upper educational levels who postpone marriage and child-bearing that Dr. Meigs thinks the cause is the "non-interruption of menstrual periods from 14 to 26 when marriage and child-bearing does not occur."

Conservative methods which will some-

times relieve the pain and other disturbances should be tried in young women, Dr. Virgil S. Counsellor of the University of Minnesota urged. The more radical procedure of removing the uterus should be reserved for women in their middle-thirties so far as possible.

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ENGINEERING

Small House Costs Cut by Improved Building Methods

➤ TEN PERCENT saving in the cost of construction of small houses designed with non-load-bearing partitions is possible, it has been proven by the Small Homes Council at the University of Illinois. Improved construction methods are the answer.

In a year-long research project, six houses were built, identical in size and arrangement. In their construction, the industry-engineered house plan developed by the Producers' Council and the National Retail Lumber Dealers Association was used. The project was a cooperative

effort of the University of Illinois and the U. S. Department of Commerce. The Producers' Council, a group of manufacturers of building materials, acted as technical advisers.

In this cost-saving construction, the house is erected as a single large room, in which partitions that bear no weight but their own are later installed. Floors and ceiling are completed before the partitions are put in place. The roof is carried by trusses, constructed on the ground in the form of triangular frames, and lifted into place as completed units.

Both exterior and interior walls are put together as complete units while flat on the floor, and then raised into position. Floors are laid, interior finish is applied on ceilings and walls, and plumbing is put into place before the interior partitions are erected. Building materials are pre-cut to dimension by powered machines before being assembled on the job.

Details of the new ideas utilized in these homes are presented by the Small Homes Council at the University in a non-technical, illustrated, 12-page circular titled CONSTRUCTION METHODS which can be obtained on request. A technical report is available also from the Council for \$2.50.

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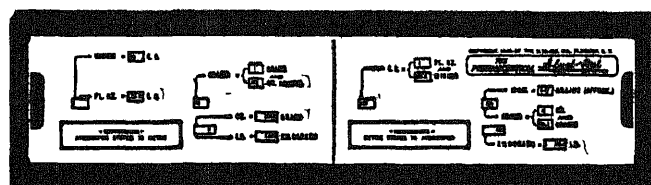
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MEDICINE

Skin Cancers Removed

➤ A CHEMICAL-SURGICAL method of removing skin cancers is announced by Dr. Frederic E. Mohs of the University of Wisconsin Medical School in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 23).

The method is said to remove the cancers "safely and completely" and to be "especially valuable for highly malignant or highly invasive lesions which fail to respond to other treatments."

A 96.2% five-year-cure rate in 291 patients with a slow-growing form of skin cancer, and an 84.4% five-year-cure rate in 136 patients with a more serious form of skin cancer are reported.

The method consists in applying a paste which kills a layer of cancer tissue without breaking it up or destroying the appear-

ance of the cancer cells. The dead layer of tissue is cut off and the cancer is removed by paste and surgery, layer by layer. Each layer of tissue is carefully examined under the microscope.

Clinics with special facilities and technical assistants trained in the technique are essential for obtaining best results with the method, Dr. Mohs points out.

This need for special facilities and special training in the technique of the method should be emphasized as a warning to the general public that the results reported by Dr. Mohs should not be expected from any salves or pastes sold and advertised as cancer cures.

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POPULATION

Boom in 1947 Baby Births Attributed to Prosperity

➤ DEMOBILIZATION and the prosperity which followed it are responsible for the record-breaking birth rate last year, P. K. Whelpton of the Scripps Foundation for Research in Population has explained in a report of the U. S. National Office of Vital Statistics.

The baby boom produced approximately 3,900,000 births in 1947, Mr. Whelpton estimates. Of these, 1,435,000 were first births to native white women. These figures do not mean that more women are entering motherhood, he says. About two-thirds of the mothers had at least one child already.

Nor does it indicate a trend toward larger families, he adds. The rates for seventh and subsequent births in 1947 were lower than those for any previous year.

Mr. Whelpton used the birth statistics for upstate New York in his calculations. The national figures for last year will not be tabulated until next winter or spring.

Science News Letter, October 30, 1948

CHEMISTRY

Flameproofing Fabrics in Home Is Simple Process

➤ FLAMEPROOFING household fabrics, particularly those of cotton, linen and rayon, can be effectively accomplished by any housewife, the National Bureau of Standards states in a recent bulletin in the interests of fire prevention.

The flameproofing formula suggested by the Bureau, one that has long been used with considerable success, contains a solution of one pound of crystalline borax and 13 ounces of boric acid in two gallons of water. The water is heated to allow the constituents to dissolve and mix. When cooled to room temperature the solution is ready for use.

Any washable fabric that is dry and clean can then be immersed in it. For fabrics that wet easily, dipping is all that is required. For heavy fabrics, a soaking from 10 to 15 minutes may be necessary to insure proper impregnation.

The article should then be wrung by hand and, upon drying, ironed at a lower temperature than ordinarily used. This treatment does not affect the color of most dyes, does not encourage mildew, and is non-poisonous. It is not permanent, however, and must be renewed after each washing.

Because of the many disastrous fires to which draperies, clothing, canvas and other textiles have added much, scientists have long worked diligently to perfect fabric flameproofing. Cotton and rayon articles present the chief problem because they are made up of vegetable fibers which, upon heating, decompose into readily combustible gases. Wool, hair, and other fibers of animal origin present a less serious problem because their protein constituents liberate non-flammable gases. Synthetic fibers, such as nylon, are usually less flammable, although they melt at relatively lower temperatures than other textiles.

Science News Letter, October 30, 1948

MEDICINE

Weapons Against Plague Successful in Field

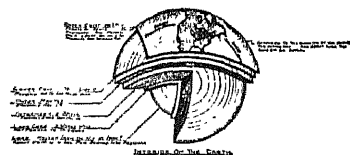
➤ SCIENTIFIC WEAPONS against bubonic plague, developed during the past half-dozen years, have now proved themselves in the field to the extent that plague is no longer an epidemic threat.

This was agreed on by two of the world's top authorities on plague, Dr. R. Pollitzer, of the World Health Organization, plague fighter in the field in China since 1921; and Dr. Karl Meyer, director of the University of California's Hooper Foundation and leader in laboratory development of the newest weapons. Dr. Pollitzer said a combination of techniques is responsible for plague's defeat.

One, DDT can temporarily suppress plague over a wide area by killing off fleas as 1080 kills rats. Two, sulfadiazine proved effective in preventing plague among persons exposed to it. Three, rabbit-immune sera and especially streptomycin cure victims who have contracted the plague. The latter two techniques were developed by Dr. Meyer at the Hooper Foundation during the past few years.

Dr. Pollitzer, stating plague is now down in China, made the first report of results of a small outbreak of seven cases in Fukien province last summer. Good results were obtained through treatment with streptomycin. Twenty-six persons exposed to these cases were treated with sulfadiazine; not one of them came down. Ordinarily, doctors would expect over half to be stricken.

Science News Letter, October 30, 1948



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"The author has produced for display in school or study, a useful quick reference sheet, for the student of elementary astronomy."—JOURNAL OF THE BRITISH INTERPLANETARY SOCIETY, London.

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A. S. T. M. STANDARDS ON PLASTICS—Committee D-20 on Plastics—*American Society for Testing Materials*, 595 p., illus., paper, \$4.50. Includes specifications, methods of testing, nomenclature and definitions.

BIBLIOGRAPHY AND INDEX OF GEOLOGY EXCLUSIVE OF NORTH AMERICA, VOLUME 12, 1947—Marie Siegrist and Eleanor Tatge—*Geological Society of America*, 359 p., \$3.50. An alphabetic author list and subject index.

CENTENNIAL SYMPOSIA, DECEMBER 1946: Contributions on Interstellar Matter, Electronic and Computational Devices, Eclipsing Binaries, The Gaseous Envelope of the Earth—*Harvard College Observatory*, 385 p., illus., \$5.00. The complete papers presented by many astronomers from various observatories at an important meeting.

CURRENT TRENDS IN CLINICAL PSYCHOLOGY—S. Stansfeld Sargent, Ed.—*New York Academy of Sciences*, 62 p., paper, \$1.50. Discussion by a number of authors of the differences between directive and non-directive therapy, and the uses of group psychotherapy and psychodrama.

ELECTROMAGNETIC WAVES AND LIGHT: An Introductory Physical Discussion, First Part—Charles F. Meyer—*Ulrich's Book Store*, 83 p., illus., paper, \$1.35. A text for students who have already studied college physics and mathematics through the calculus.

EMOTIONAL SECURITY—Milton R. Sapirstein—*Crown*, 291 p., \$3.50. Applying the principles of psychoanalysis to the problems of healthy adjustment in marriage and other spheres of daily life.

ENGINEERING THERMODYNAMICS: Theory and Applications—Jesse Seymour Doolittle and Alexander Hamilton Zernan—*International Textbook Co.*, 428 p., illus., \$5.00. A text for engineering students.

FEEDS AND FEEDING: A Handbook for the Student and Stockman—Frank B. Morrison—*Morrison Publishing Company*, 21st ed., 1207 p., illus., \$7.00. Revised and rewritten to include the most recent advances in animal nutrition.

FONTES HISTORIAE BOTANICAE ROSSICAE—Vladimir C. Asmou—*Chronica Botanica*, 31 p., illus., paper, \$1.25. An enumeration of all the publications which deal with the history of botany in Russia. The Russians, states the author, have been lovers of nature, flowers and plants since olden times.

FUNDAMENTALS OF PHYSICAL SCIENCE: An Introduction to the Physical Sciences—Konrad Bates Krauskopf—*McGraw-Hill*, 2d ed., 676 p., illus., \$4.50. For the general reader or college student who wants a general knowledge of the physical sciences rather than detailed study in any one.

HOW LAYMEN CUT MEDICAL COSTS—*Public Health Institute*, 35 p., illus., free upon request to the publisher, 127 North Dearborn St., Chicago 2, Ill. The story of a venereal disease clinic which gave nearly 6,000,000 treatments to 359,496 individuals, many of whom could not pay, and which remained self-sustaining.

THE HYGIENE OF THE BREASTS—Clifford F.

Dowkontt—*Emerson Books*, 222 p., illus., \$2.50. A specialist in plastic surgery of the breast writes on the care and proper dress of the breasts for nursing mothers and other women who wish beauty with health.

INVENTORY OF RESEARCH IN RACIAL AND CULTURAL RELATIONS, Bulletin No. 1—June 30, 1948—*Committee on Education, Training and Research in Race Relations of the University of Chicago and The American Council on Race Relations*, 55 p., paper, \$1.00.

THE LIFE OF SCIENCE: Essays in the History of Civilization—George Sarton—*Schuman*, 197 p., \$3.00. Collected essays by the well-known Harvard historian of science in his delightful, inimitable style.

MESON THEORY OF NUCLEAR FORCES—Wolfgang Pauli—*Interscience*, 2d ed., 69 p., \$2.00. Revised in consequence of the fact that some of the older experiments have become obsolete, this book by a Swiss scientist is based on a lecture given in 1944 at MIT.

THE SOUTH AMERICAN HANDBOOK 1948: A Year Book and Guide to the Countries and Resources of South and Central America, Mexico and Cuba—Howell Davies, Ed.—*Trade and Travel Publications (H. W. Wilson)*, 25th ed., 778 p., \$1.50. A useful reference book of British origin containing information for each country on geography, economics, resources, and politics.

VACUUM TUBE AMPLIFIERS—George E. Valley and Henry Wallman—*McGraw-Hill*, 743 p., illus., \$10.00. A technical book intended to preserve the experimental findings of the Radiation Laboratory at MIT.

YOUR LIFE IS IN YOUR GLANDS: How Your Endocrine Glands Affect Your Mental, Physical and Sexual Health, Your Appearance, Personality and Behavior—Herman H. Rubin—*Stratford House*, 192 p., illus., \$2.75. A description, in non-technical language, of the nature and behavior of the powerful endocrine glands.

Science News Letter, October 30, 1948

GENERAL SCIENCE

Engineer To Receive Medal For Scientific Achievement

► THE 1949 John Fritz Medal for scientific achievement will go to Charles Metcalf Allen, professor of hydraulic engineering at Worcester Polytechnic Institute and director of the Alden Hydraulic Laboratory, Worcester, Mass., it was announced by the Board of Award.

Prof. Allen was cited "for exceptional achievement in hydraulic engineering," and as "the founder of a notable hydraulic laboratory; prominent teacher, consultant, inventor and author."

Science News Letter, October 30, 1948

Scientists have discovered that by varying the pitch of *supersonic sound* they can kill one kind of germ and leave other germs alive.

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⚙️ **SAFETY STEPLADDER**, for use in the home, has three sturdy hinged platforms at three convenient levels instead of the conventional treads used in most ladders. The user literally stands within the ladder, close to the job, and directly over the center of gravity. Platforms not in use swing easily out of the way.

Science News Letter, October 30, 1948

⚙️ **SLIDE RULE**, pocket-size and made of a white plastic, consists of three parts, the rule proper with overturned edges to hold the slide in place, the slide itself, and an indicator with a hairline in the center. The six-inch device can be used for mathematical problems from multiplication to cube roots.

Science News Letter, October 30, 1948

⚙️ **SILICONE-TREATED tissues**, for cleaning the lenses of eyeglasses, leave an invisible film of silicone on the surface of the glass which improves clarity and protects the lenses from minor surface scratches. They are recommended also for cleaning the surface of women's compact mirrors.

Science News Letter, October 30, 1948



⚙️ **COFFEE BREWER**, that makes a single cup at a time, consists of an aluminum drip-top, a plastic cover to hold the heat during dripping, and a half-pint glass cup encased in a non-breakable plastic holder with a handle. The picture shows the assembly in use.

Science News Letter, October 30, 1948

⚙️ **PASTRY CLOTH** for pie-making is a plastic sheet to which the dough does not stick. In use, dough is placed between two sheets, rolled to the proper size and thickness, the top film peeled off, the dough inverted into the baking pan, and the other film removed. The dough never touches the rolling pin or the pastry board.

Science News Letter, October 30, 1948

⚙️ **MOTORCYCLE COVER**, tailor-made of water-proof nylon, fits snugly over the machine in storage and protects it against weather, rust, dust and grime. When not in use, the cover is folded to occupy a space 10 inches long, six wide and two thick.

Science News Letter, October 30, 1948

⚙️ **INDIVIDUAL CORRUGATED** paper packets for salt are intended to replace the use of salt shakers in hospitals and railway diners and on airplanes. Each unit, about the size of a package of paper matches, contains four cells to hold the salt; the corrugations provide a sprinkling action similar to that of a regular shaker.

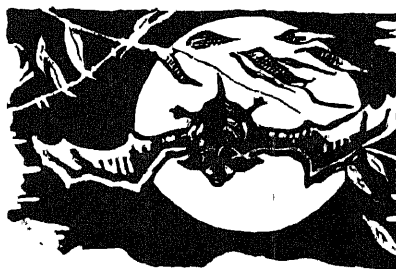
Science News Letter, October 30, 1948

• Nature Ramblings by Frank Thone •

➤ **HALLOWE'EN**, as probably everybody knows without needing to be told again, is a contraction of All Hallows' Even, which means the eve or vigil of the Feast of All Saints, long ago appointed by the Church to be observed on the first day of November. Like the vigils of all the major feasts, it is liturgically a day of fasting and prayer; but stubborn sinners have persistently balked at this and turned the evening into a time of merrymaking within doors and of mischiefmaking without.

The carnival nature of present-day Halloween observance is said to be a survival of the pagan saturnalia, a harvest-home festival observed in ancient Latium even before the founding of Rome. After their hard labor in getting in the crops, slaves and hired field hands were rewarded with a week of license, when they could get as drunk as they pleased and raise hob-gen-

Old Gods Return



erally. It was supposed to represent a return of the reign of Saturn, banished father of the gods—a legendary golden age of prosperity and plenty, of all play and no work.

When all the old pagan gods followed Saturn into banishment after the triumph of Christianity, they were regarded as

devils. Saturn shared with Satan the kingdom of the dark, and his roistering followers naturally acquired familiars and pets from among the nocturnal fauna—bats and owls and black tomcats. Since slavery no longer exists, it is children and adolescents who take advantage of an evening of relaxed discipline, and disguise themselves as imps and ghosts, warlocks and witches.

The one distinctively American element that has been added to the Halloween ritual is the use of hollowed-out pumpkin shells as the foundation of the fiery face of the mock Saturn—or Satan, if you prefer. Pumpkins and hard-shelled squashes were unknown in Europe before the discovery of America, but their obvious suitability for making grotesque scare-heads brought about their adoption into the carnival paraphernalia even in Colonial times.

Science News Letter, October 30, 1948

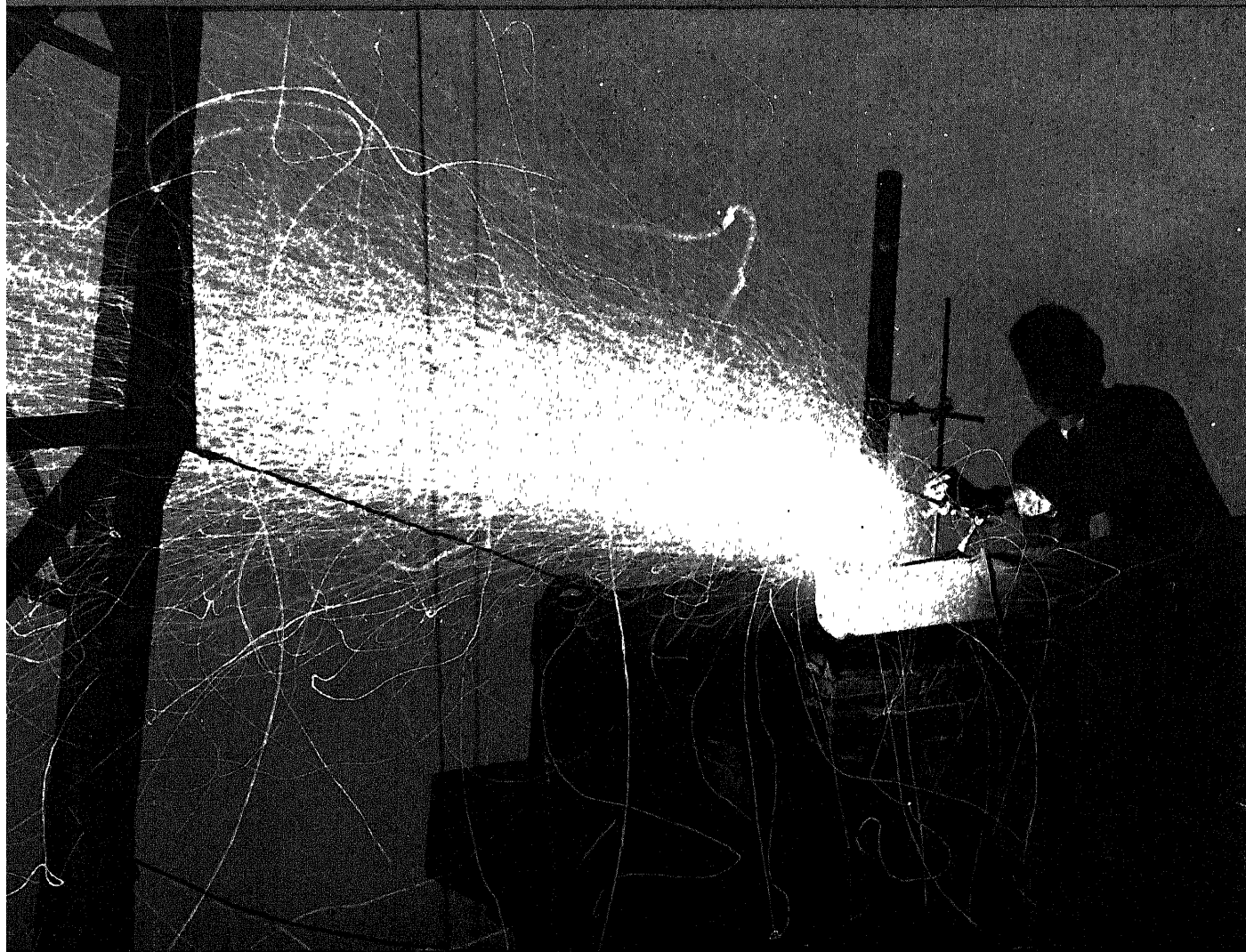
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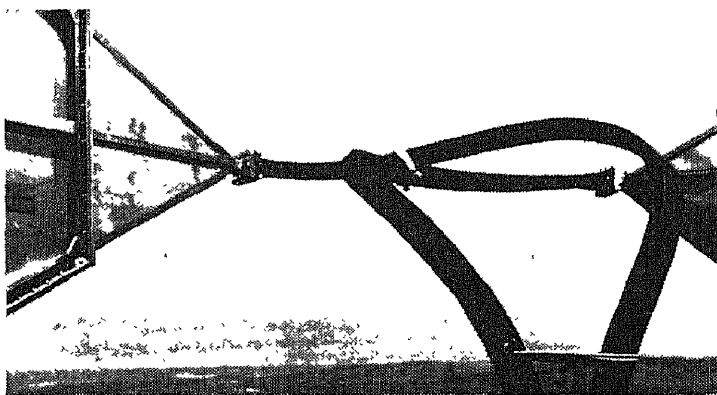
Fire for Rain

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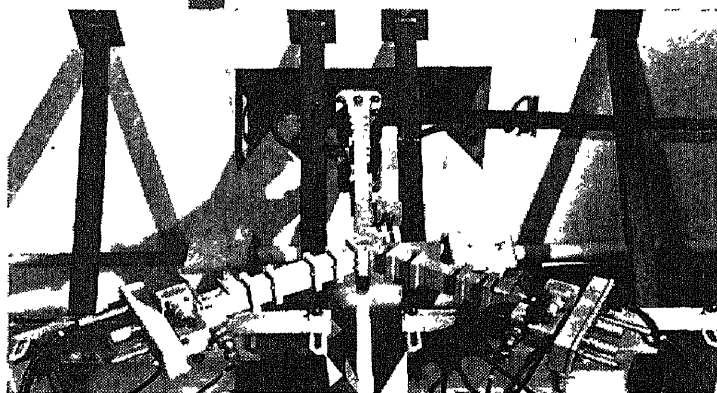
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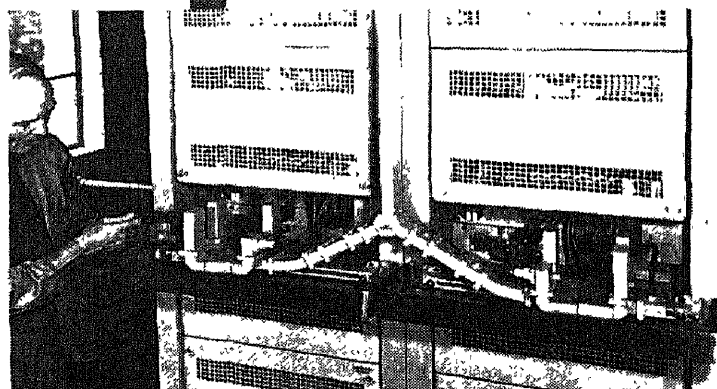
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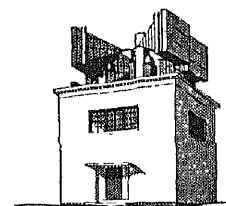
3 The waveguide connects with horn antennas which are pointed toward similar antennas at the next stations miles away.



2 Looking upward, the waveguide continues through the roof of the station toward the antennas.



1 Base of a waveguide circuit in a repeater station of the New York-Boston radio relay system.



Pipe Circuits

UNLIKE radio broadcast waves, microwaves are too short to be handled effectively in wire circuits. So, for carrying microwaves to and from antennas, Bell Laboratories scientists have developed circuits in "pipes," or waveguides.

Although the waves travel in the space within the waveguide, still they are influenced by characteristics found also in wire circuits, such as capacitance and inductance. The screw or stud projecting inside the guide wall acts like a capacitor; a rod across the inside, like an inductance coil. Thus transformers, wave filters, resonant circuits—all have their counterpart in waveguide fittings. Such fittings, together with the connection sections of waveguide, constitute a waveguide circuit.

From Bell Laboratories research came the waveguide circuits which carry radio waves between apparatus and antennas of the New York-Boston radio relay system. The aim is to transmit wide frequency bands with high efficiency—band widths which some day can be expanded to carry thousands of telephone conversations and many television pictures.

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PSYCHOLOGY

New Light on Mental Ill

A physiological difference has been found between normal persons and schizophrenics which centers about the response of the adrenal glands to stress.

➤ **TWO SMALL GLANDS** above the kidneys and one at the base of the brain may hold the key to a medical treatment for the mental disease, schizophrenia.

Among those engaged in the research, believed the first ever to show clear cut physiological differences between normal persons and psychotics, are: Dr. Gregory Pincus, director of laboratories of the Worcester Foundation for Experimental Biology in Worcester, Mass.; Dr. Hudson Hoagland, executive director of the Foundation; Dr. Harry Freeman, an endocrinologist associated with the group; and Fred Elmadjian, a physiologist.

Their work casts a new light on the mental disease known as schizophrenia. A schizophrenic is a person who is living in a waking dream state. He has lost contact with reality and cannot disentangle external events from those which take place in his dream world. One half of the beds in mental hospitals are occupied by schizophrenics.

The glandular differences between normals and schizophrenics center about the response of the adrenal glands reacting to stress. The adrenals are two small glands located on top of the kidneys. When a normal person is subjected to stress—any sort of stress from breathing air with a low oxygen content to waking up in the morning—the adrenal glands send out an increased flow of chemical messengers into the bloodstream.

These messengers are known as adrenal cortical hormones. They are vital to life, since they control such functions as the use of fuel by the body and storage of sugar by the liver.

The schizophrenic shows no appreciable increase in adrenal output in response to stress. Furthermore, his physiological behavior is different from normal in another important respect.

The adrenals also regulate the use of sodium and potassium salts by the brain and other body tissues. In the normal person, the body's potassium output is increased after stress, but in schizophrenics no such change is noted. This may indicate that a psychotic's brain does not undergo the same chemical responses as that of a normal person.

These isolated facts are the first scientific demonstrations of an abnormal physiology in mental patients. They may lead to the discovery of important physical differences between normals and schizophrenics.

The implication is therefore that the research in Worcester may be the first step in the eventual development of a physio-

logical method of treatment for mental disease.

A further discovery has been made, narrowing down the area of search for the defective mechanism in the schizophrenic. It involves control of the adrenals by the pituitary, a small gland located at the base of the skull. In order for the adrenals to respond to stress, they must first receive a message from the pituitary in the form of a hormone known for short as ACTH, which is adrenocorticotrophin when spelled out in full. In answer to this message, adrenal cortical hormone is secreted into the blood by normal persons. The question in the case of schizophrenics was whether

the actual deficiency lay in maladjustment of the adrenals or in the failure of the pituitary to send out ACTH.

To answer this problem, the scientists injected ACTH into the bloodstream of psychotic patients, and then measured the adrenal cortical hormone output. The fact that no increase in output was measured shows that the mechanism of adrenal output is at fault, and therefore, in all probability, the delicate operation of the adrenal glands has been in some way impaired in schizophrenics.

The breakdown of the adrenals results not only in effects on the salt and fuel economy of the brain, but also destroys general ability of the body to adapt to an ever-varying environment. For that reason, a schizophrenic cannot react to the constantly changing demands of daily life.

The why and how of this adrenal impairment is not yet understood, but in the future of research in this field may lie the eventual solution of one of the most serious problems of our civilization—mental disease and its treatment.

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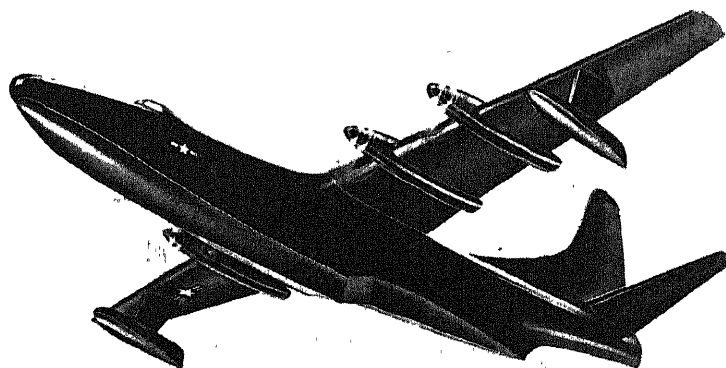
BOTANY

Green Plants' Evolution

➤ **EVIDENCE** that green plants are the climax of a long line of evolution toward self-sufficiency in the use of the energy of the sunshine is being presented in national Sigma Xi lectures throughout the country

by Dr. C. B. van Niel of Stanford University's Hopkins Marine Station at Pacific Grove, Calif.

Dr. van Niel, who is professor of micro-chemistry and an authority on photosyn-



PATROL FLYING BOAT—This is an artist's conception of the XP5Y-1, two of which are being built for the U. S. Navy by Consolidated Vultee Aircraft Corp. of San Diego. It has a quick take-off and high speed due to its four powerful, propeller turbine, Allison engines and is designed for long-range day and night search of sea areas, rescue operations, and anti-submarine patrol. The first experimental XP5Y-1 is expected to fly early in 1949.

thesis, is speaking before chapters and clubs of the Society of the Sigma Xi, the Scientific Research Society of America.

Modern plants, with their green chlorophyll, utilize the energy of the light from the sun to break down molecules of water. They build the hydrogen thus obtained, along with the carbon dioxide they take from the air, into their plant structures. The oxygen they discard in this process maintains the balance of nature and the constitution of the air.

The earliest plants, Dr. van Niel is telling his scientific audiences, could not have made use of this complicated process which combines two radically different mechanisms: First, the photochemical reaction; second, the liberation of molecular oxygen.

Evidence has been found, Dr. van Niel reports, that certain purple bacteria make use of a simpler kind of photosynthesis. This method may have preceded that which takes place in the green chlorophyll. It is accomplished by a photochemical decomposition of water as in green plants. In both types of photosynthesis the hydrogen is transferred to carbon dioxide. But only in green-plant photosynthesis is oxygen evolved. In bacterial photosynthesis an oxidation product other than oxygen takes its place, and this must be continuously reduced. That requires the simultaneous oxidation of a reducing substance, for example a secondary alcohol. All these re-

actions take place under the influence of various enzymes.

It is reasonable, Dr. van Niel found, to regard the evolution of photosynthesis as proceeding from organisms with highly developed synthetic mechanisms but not yet endowed with photochemically functional pigment systems.

The pathway of development would then lead in the direction shown by the mechanisms in use by the purple bacteria. Their pigment systems were present in their colorless ancestors, but they were not yet independent of extraneous reducing chemicals.

"The next step in the evolutionary sequence," Dr. van Niel reports, "would then be concerned with changes whereby the 'oxidation product' of the photochemical reaction becomes capable of self-regeneration through the elimination of molecular oxygen. This is the mechanism operative in green plants."

"Interpreted in this manner, green plant photosynthesis appears as the ultimate result of that line of physiological evolution which represents the gradual development of synthetic mechanisms, and in which the organisms become progressively more independent of an external supply of reducing substances. Only with green plant photosynthesis has complete independence been acquired."

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green pigment, chlorophyll. As autumn advances, the chlorophyll dies and loses its color, while the xanthenes remain. Formation of the anthocyanins is promoted by the clear, sunny weather of the "Indian summer" type, cool but not frosty. Frost, if it comes too early in autumn, actually prevents the development of good autumn coloration.

The outside influences that set the leaves on the way towards their autumnal glory are complex, hence not well understood. They are not unlike the complex of causes that produce the ripening of fruit; indeed, an autumn-colored leaf might well be regarded as a ripe leaf rather than as a dead one.

Letters To The Editor

Autumn's Colors

If many readers of the SCIENCE NEWS LETTER are like myself they are curious to know what are the causes and contributing factors resulting in "Golden, crimson, purple, russet, scarlet—autumn's brave banners . . ."—J. Edward Johns, Columbus, Ohio.

The yellows and orange-reds in autumn leaves are due to the presence of a group

of pigments known collectively as the xanthenes. Carotene, which gives carrots, rutabagas, squashes, etc., their characteristic color, is one of the xanthenes. The purples and deep crimsons are due to another group of pigments, the anthocyanins, which are also responsible for the colors of such things as purple cabbage, beets, and red-foliaged ornamental plants.

The xanthenes are present all the time, but are covered up by the more abundant

Question Box

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PSYCHOLOGY

Belligerency Not Inborn

Warlike tendencies in mankind are acquired, an international group of social scientists believe. Science may help to maintain peace.

➤ SCIENCE is often blamed for causing war. The answer is: Man, not knowledge, causes war. Consider the combative cave-men or the death-to-death struggles between the ancients before the dawn of modern science.

War can be avoided and peace maintained by using the methods and knowledge of science. That is the belief of those who have been working on the problem.

"War is not born into men; it is built into men." Two thousand American psychologists in 1945 agreed that "no race, nation or social group is inevitably warlike."

An international group of social scientists summoned this year by UNESCO put it this way:

"There is no evidence to indicate that wars are necessary and inevitable consequences of 'human nature' as such. The problem of peace is the problem of keeping group and national tensions and aggressions within manageable proportions and of directing them to ends that are at the same time personally and socially constructive so that man will no longer seek to exploit man."

Scientists in arguing the usefulness of science in maintaining the peace are not suggesting that they should take over the day-to-day international relations job from the diplomats or that they should replace the military commanders. They do believe that they can and do help both the diplomats and the military in very practical ways so far as they are allowed.

Science and technology constitute the one field of human endeavor that is most truly international. They provide bridges between peoples, nations and ideologies that art, music, religion and business cannot furnish.

One of the tasks of UNESCO (United Nations Educational Scientific and Cultural Organization) is to apply science to the international scene. When the U. S. National Commission for UNESCO met recently in Boston there were suggestions of immediate as well as long-time contributions of science to world peace.

Dr. Arthur H. Compton, Nobelist in physics and chancellor of Washington University, St. Louis, listed science's human values and the insistence on freedom and honesty as major contributions to world peace.

Freedom and honesty are basic to science and at the very heart of the democracy of free peoples. Yet Dr. Compton distinguished between a state of cooperation undisturbed

by war and a peace that gives satisfactory life to free peoples. All Americans, he said, are more concerned with the maintenance of human freedom than even with peace. Science, he recognized, could be used to produce the peace of serfdom instead of freedom. This would happen if the Eastern

instead of the Western political pattern were permitted to become dominant.

Science naturally develops on a worldwide front and provides all nations with natural channels to and from their neighbors. Dr. Compton considers the encouragement of the growth of science and technology throughout the world as the most powerful existing force working toward world peace.

Is there enough time for this force to operate? That is a major question. War would torpedo the world organization necessary to apply science and technology to food, transport, energy and other such requisites. For these reasons alone, war would be a crime against civilization.

Science News Letter, November 6, 1948

ENGINEERING

Cadmium Mercury Lamp

➤ A NEW TYPE of mercury vapor lamp, designed for use in motion picture studio, to replace the carbon arc lamp now employed, was demonstrated to the Society of Motion Picture Engineers in Washington. It is actually a cadmium-mercury lamp, in which a small amount of cadmium is added to the mercury.

Adding the cadmium to the mercury inside its rugged quartz bulb adds enough red and other colors to the light to make it suitable for color movies. The experimental lamp produces high-power light

which streams from a high-pressure arc which, although only as long as a peanut, is about half as bright as the sun.

This short-arc lamp was one of several experimental mercury types demonstrated by Eugene W. Beggs of the Westinghouse Lamp division, Bloomfield, N. J. He dubbed it a 10,000-watt "cantaloupe" of quartz, and the brightest cadmium mercury light ever made in America. While it rivals the carbon arc in brilliance, it will add to studio comfort because it is cool, radiating only a minimum amount of heat.

Science News Letter, November 6, 1948



HIGH POWER LIGHT—The experimental 10,000-watt movie lamp which is for direct current operation is shown at the left and a similar lamp for alternating current circuits is at right.

PSYCHOLOGY

Mind Affected by Fear

➤ FEAR AND SUSPICION can turn even wild rats into abject "strap-hangers." These anxious animals stand on their hind legs by the hour, hanging like subway riders onto wires at the top of their cages. Even when their cages are left open, they make no attempt to escape. One animal even developed what would be called thumb-sucking in a child.

These strap-hanging rats just stand motionless with their noses thrust through the wire mesh of their cages, eyes fixed straight ahead. And they keep this posture for months, except when they are disturbed or when they eat or drink. Then they run around the cage a few times and go right back to their awkward pose.

The fear that drove the animals into this psychotic state was the fear of food poisoning, Dr. Curt P. Richter, of Johns Hopkins Hospital, told the Mooseheart Symposium on Feelings and Emotions at the University of Chicago.

If such a simple fear can produce such abnormal behavior in wild rats, what will mutual fear and suspicion between nations do to the minds of men in the countries involved in this atomic age, the scientific men at the meeting were speculating?

Dr. Richter is the scientist who, in the course of psychological experiments on the rat's ability to taste, discovered the potent rat poison ANTU. The terrified rats were some that had survived poisoning with ANTU or other poison which had made them very ill.

In later experiments, they were given a choice of eating from either of two food cups. One contained the poisoned food, the other was safe. It was found that the rats could recognize the poisoned food. But, nevertheless, they became suspicious of the unpoisoned food as well. This fear and suspicion is what led to their abnormal behavior.

The strange behavior developed in five out of 30 rats used in the poison experiments.

Science News Letter, November 6, 1948

Tension Sweeps Mobs

➤ THE POPULAR IDEA that crowds or mobs are always so swept away by emotion that they are incapable of rational behavior is a fallacy and should be abandoned, Dr. Franklin Fearing, of the University of California, told the same meeting.

The idea that the group generates an irrational mind or spirit is a notion that was abandoned by psychology in the 1920's, he said. It tends to de-value all collective behavior, and hence is a barrier to the understanding of the full creative possibilities of group action in a democracy.

It would be much better, Dr. Fearing suggests, to give up the use of the term emotion or emotionality as applied to crowds and substitute the concept of "tension."

Science News Letter, November 6, 1948

PSYCHOLOGY

Neurosis from Monotony

➤ SHEEP and goats do not worry as we do, but monotony and a rigid time schedule can drive them into a nervous breakdown. This is what Dr. H. S. Liddell of Cornell University has observed in animal experiments reported to the Mooseheart Symposium on Feelings and Emotions in Chicago.

Their state of chronic, unrelieved tension may be severe enough, Dr. Liddell found, to alter their behavior not only in the laboratory, but in the pasture and the barn for years or for life.

The animal neurosis developed in the course of classical experiments on conditioning first developed by the Russian psychologist Pavlov.

The animal, put into a harness during his daily training, soon learns to control his restlessness and to remain quiet in spite of occasional mild electric shocks on the foreleg. If the shock is regularly preceded by a signal, the animal soon learns to flex his foreleg in anticipation of the shock that is to follow. He will "remember" to do this

for at least three years without practice.

All this is harmless enough. But a neurosis is brought on when the shocks are given with monotonous adherence to a strict time schedule.

If the shocks are applied every two minutes exactly, the animal "freezes" into a state of rigidity like that which physicians see in humans sometimes and call "conversion hysteria."

If the shocks are separated by a constant time interval of five, six or seven minutes, the result is a chronic state of diffuse agitation. In the first case the heart rate is slow, in the second it is rapid and irregular.

Even when the animal is given complete freedom of movement during the experiment, the shocks at regular two-minute intervals will make him go and stand rigidly against the wall exactly as if he were held in the position with the restraining harness.

The presence of his mother may protect a young animal from the psychological danger of this monotonous regimen, it was

found. Twin goats a few weeks old were subjected to the experiment using two-minute time intervals. One was alone in the room when the test took place. The other had his mother's company. The solitary twin developed neurotic manifestations; the other was saved by his mother's presence.

"In our culture," Dr. Liddell said, "the demand for precision of psycho-motor skills and the monotony involved in their co-operative exercise may, we believe, endanger the functional integrity of the nervous system. Our program of investigation may aid in discovering a prophylaxis for the necessary evils of our present mechanical, rigidly time-structured mode of living."

Science News Letter, November 6, 1948

BIOCHEMISTRY

Adding Special Sugar Helps Body Utilize Fats

➤ FORTIFYING butter, oleomargarine and other fats by adding a special sugar to them may become the next step toward improving our diets, if research by Dr. Curt P. Richter of the Johns Hopkins Medical School in Baltimore proves applicable to humans.

Rats, Dr. Richter finds, make much better use of fat as nourishment when they have a little of the special sugar to go with the fat. The special sugar is galactose. It is found in milk sugar and can be converted to lactose.

The studies bring out a hitherto unsuspected relationship between fat and galactose. The findings also reverse some by other scientists who reported a few years ago that fat played an important part in the utilization of galactose.

Dr. Richter's studies, reported in the journal, SCIENCE (Oct. 22), were made by the "single food choice" technique. Rats of standard weight and under standard conditions are put on a diet consisting of only one foodstuff and water. The length of time the rats survive is taken as a measure of the nourishing value of the foodstuff.

Rats on no food at all survived an average of 4.3 days. With only galactose, the special sugar, for food, the average survival was 6.2 days. On oleomargarine alone, the average survival was 32.4 days. On galactose and oleo it was 69.3 days.

The calories furnished by the sugar were not responsible for the longer survival, because rats allowed to eat as much as they wanted of both oleo and sugar ate very little of the galactose. For some animals it furnished only five percent of the total calories and some ate none at all for 15 days.

Butter was not used in the experiments because they were started during the war when not enough butter was available. Preliminary experiments with corn oil instead of oleo have so far given essentially the same results.

Science News Letter, November 6, 1948

PALEONTOLOGY

Reconstruct Weird Beasts

Accurate reconstruction of the appearance of a group animals from their fossil footprints has been made possible by a scientist's studies.

➤ AN ACCURATE PICTURE of weird beasts that trod the earth about 200,000,000 years ago, leaving perfect footprints on mudflats but apparently no skeletal remains, has been drawn by Dr. Frank Peabody, working in the paleontology laboratories of the University of California.

The beasts were a group of animals that ranged in size from a chicken to a dinosaur-like animal standing six feet high at the hips. The family name of Chirotherium has been given to the entire group. The name means "hand animal," because of the remarkable resemblance of the hind foot to the human hand.

How a body of scientific evidence was built up, from which Chirotherium's appearance was deduced, on the basis of the beast's "fingerprints," is recited in a new University of California publication by Dr. Peabody, who is now at the University of Kansas. In the course of his eight-year study he was able to set up criteria for determining the anatomical characteristics and general appearance of any animal on the basis of its tracks alone.

Dr. Peabody began his studies in 1938, when he was a member of a paleontology party from the University working in the sandstone beds of the Meteor Crater region of Arizona. Several trackways of Chirotherium were included in the material.

Dr. Peabody, then a graduate student, became interested in these tracks, and devoted all his graduate work to their study.

He soon found that while many studies had been made of individual tracks of Chirotherium and other animals, no systematic work had been done on a trackway, that is, three or more consecutive steps.

So he began several years of painstaking work by studying the trackways of all living salamanders. He took trackways of salamanders in their usual environment, and he made the animals walk across smoked paper and laboratory mudflats.

He analyzed the characteristics of the foot, the length and width of stride, orientation of feet, tail marks. He studied a number of other factors, such as what he calls pace angulation, the angle formed by three consecutive steps.

As a result, he found that he could establish criteria by which he could classify all living salamanders on the basis of trackways alone, determining their size, length of body, height, weight, etc. His next step was to compare living salamander tracks with 20,000,000-year-old fossilized salamander tracks taken from an old gold

mine in the Sierra Nevada. He found no significant changes in salamanders during the past 20,000,000 years. He extended his studies to living mammals and reptiles.

Using the "yardsticks" he had established with living and recent animals, Dr. Peabody began to work in earnest on Chirotherium. With the help of his colleagues, he excavated more trackways from the Painted Desert of Arizona.

The end result was a verification of the reconstruction of Chirotherium by a German scientist, Wolfgang Soergel, though Dr. Peabody's conclusions were based upon more solid evidence than had been available before.

Dr. Peabody's studies have made it possible to predict more accurately what the skeletal remains of Chirotherium should be like, so that scientists will be able to iden-

tify them more easily if its bones are ever found.

Science News Letter, November 6, 1948

PHYSICS

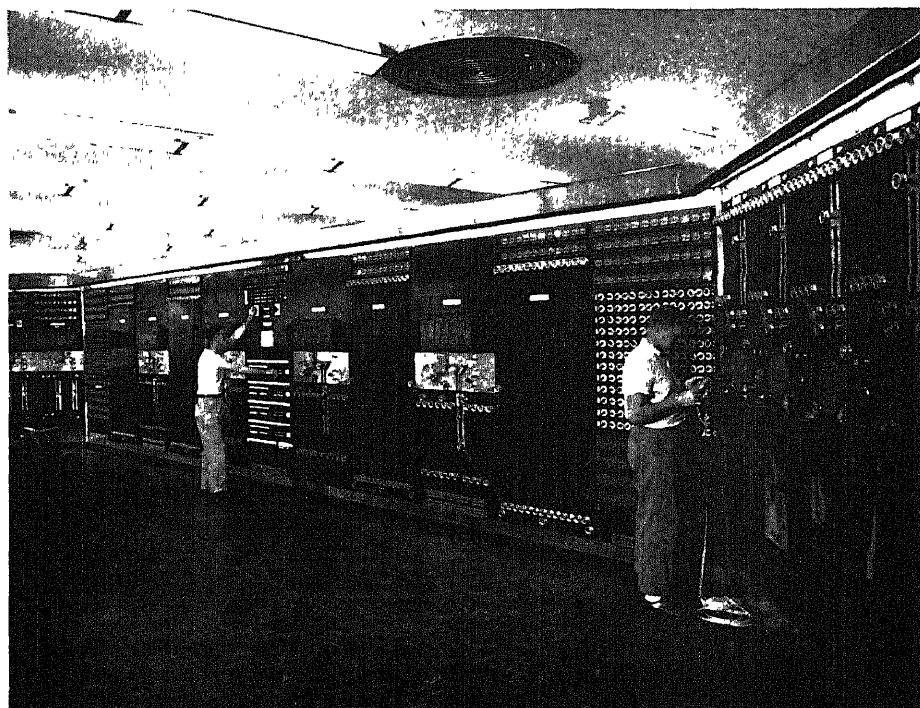
Spectrographic Methods Detect Traces of 1080

➤ LATTER-DAY Lucrezia Borgia may find the going tough if they use the new super-rough-on-rats, 1080, on inconvenient aunts or straying sweeties. Two new methods for detecting it in almost infinitesimal quantities were described before the meeting of the American Chemical Society in Detroit, by Dr. Charles W. Rankin of the New York State Police Scientific Laboratory at Albany.

Both methods are spectrographic, depending on the position of characteristic bright lines in the artificial rainbows made by splitting light from electrically burned specimens of material suspected of containing 1080. Both methods, Dr. Rankin stated, are capable of detecting the presence of as little as 100 micrograms of the poison.

A microgram is one millionth of a gram, or one twenty-eight-millionth of an ounce.

Science News Letter, November 6, 1948



25-TON MECHANICAL CALCULATOR—This shows the front of the Aiken Relay Calculator installed at the Naval Proving Ground, Dahlgren, Va., for use in guided missile computations. Operator at left is at one of the control panels and man to right is in front of the specially adapted teletypes which punch out the answers on paper tape. Four sequence mechanisms allow the calculator to handle, pass on or transfer numbers at the rate of 60 per second. Addition of numbers running into the billions can be done in less than one-fifth of a second.

MEDICINE

Bacitracin Is Now Available Commercially

➤ BACITRACIN, the antibiotic discovered in 1945, is now available commercially, but you will need a physician's prescription to get it.

The drug has proved effective in the treatment of many skin and local surgical infections, such as boils and abscesses, often making surgery unnecessary. It also checks the growth of many gram-positive streptococci and staphylococci, as well as the pneumococcus, gonococcus, meningococcus and the spirochete of syphilis.

It was isolated by Dr. Frank L. Meleney of the Columbia College of Physicians and Surgeons from the infected wound of a patient.

Science News Letter, November 6, 1948

BACTERIOLOGY

Photograph Bacteriophage In Act of Killing Germs

➤ HOW bacteriophages, the "germs" that kill germs, operate has been photographed with the aid of the electron microscope at the National Institutes of Health in Bethesda, Md. by Dr. Ralph W. G. Wyckoff. His report, with three of the photographs, appears in the British journal, NATURE (Oct. 23).

Contact with the bacteriophage particles apparently kills the bacteria on which they prey, causing their protoplasm to dissolve and flow out of the bacterial body. Thereupon the particles begin to "devour" it, eventually covering the loose protoplasm and increasing their number and individual size at its expense.

This "devouring" of the bacterial protoplasm by the extremely minute particles justifies the name given to bacteriophage before the invention of the electron microscope made their direct study possible. The word bacteriophage means "bacteria-eater," and the name was applied years ago to an invisible something, beyond the reach of ordinary microscopes, that caused bacteria to dissolve and disappear.

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CHEMISTRY

New Uses for Silicones Predicted for Near Future

➤ OILS, greases, resins, rubber and other products of the relatively recently developed silicones, a new chemical family, are sure to be followed by many new products, the American Society of Mechanical Engineers was told in New York by K. W. Given of the chemical department of General Electric, Pittsfield, Mass. Some of these new products will be available soon.

Because of the ability of the silicones to withstand extremes of heat and cold, to

resist moisture and to remain unaffected by most other chemicals, some of their uses will be revolutionary, he said. Glass cloth soaked in silicone resin produces an electrical insulation which will withstand great heat, and silicone varnishes, enamels and paints produce finishes that resist acids, alkalis, fresh or salt water, oils and weather. A water-repelling silicone film will have many uses.

Silicones are made from organic compounds plus silicon, one of the earth's most plentiful elements. About 76% of the earth's crust is composed of silicon and oxygen, the components of sand. Studies of silicon chemistry have extended over several decades, but the development of the silicones and their applications was hastened by the wartime need of the armed services for a material resistant to heat, cold and chemical action.

In the manufacturing process, silicon is ground and mixed with certain chemicals in a reactor. Gas is formed, from which is made a liquid, the basis of silicone products.

Among these chemicals, Mr. Given stated, is one with a name of 31 letters, "polyorganohalogenopolysiloxanes." The vapor from one form of this liquid forms a sub-microscopic water-repellent film. Porous porcelain filters treated with it will permit the passage through them of compressed air, gasoline and solvents, but not water.

Other uses for this film are for windshields, camera lenses, textiles and paper. A silicone water repellent film may some day be used to treat cloth for clothing, he said. At the end of a walk in the rain the beads of water on the clothing could be shaken off, the clothes remaining neatly pressed.

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MEDICINE

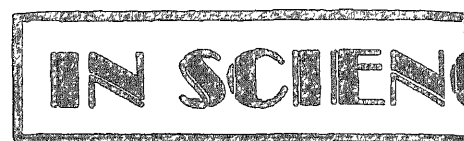
Medicinal Dust-Inhalation Relieves Asthma Sufferers

➤ A NEW METHOD for bringing relief to asthma sufferers and for patients with bronchial spasm not due to asthma is reported by Drs. L. R. Krasno, M. Grossman and A. C. Ivy of the University of Illinois College of Medicine and the Illinois Masonic Hospital in Chicago in the journal, SCIENCE (Oct. 29).

It consists of inhalations of Norisodrine Sulfate dust from a pocket-sized inhalator. The medicine itself, known also as Aleudrin, has previously been reported effective when given in liquid form by injection, by mouth or by inhalation in a mist. The idea of using it as a dust followed the discovery that penicillin dust was a practical and effective form of giving the mold remedy for infections of the breathing tract.

Sixteen of 24 patients were able to ward off an impending attack of asthma by whiffs of the dust, inhaled through the mouth. The other eight needed other medicines in addition to the Norisodrine.

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MEDICINE

Change in a Body Chemical Found to Accompany Cancer

➤ DISCOVERY that a change in the nature of a body chemical takes place during the development of one kind of cancer is announced by Drs. Christopher Carruthers and V. Suntzeff of Washington University School of Medicine, St. Louis, in the journal, SCIENCE (Oct. 22).

Heretofore scientists have found evidence only for differences in quantity of chemicals in cancerous and normal cells. The significance of these quantitative changes has been difficult to evaluate.

A change in the structure of a lipid, or fatty substance, takes place during the development of skin cancer in mice, the St. Louis scientists now announce. The change is due, they report, to a quantitative alteration of a part of the lipid material of normal and abnormally multiplying mouse skin. But the net result is a change in quality resulting in altered physical and chemical properties of the lipid.

Science News Letter, November 6, 1948

GENERAL SCIENCE

Science Clubs of America To Cooperate with UNESCO

➤ YOUNG SCIENTISTS in the nation's high schools will cooperate with students abroad in various lands under recommendations made by the natural sciences section of the U. S. National Commission on UNESCO (United Nations Educational, Scientific and Cultural Organization) at its recent Boston meeting.

International cooperation by youth of all nations in science projects will "aid international understanding and also result in the broader dissemination of information on the methods and advances of science."

Science Clubs of America, an activity of Science Service, is already directing the attention of the 15,000 science clubs in the United States and their third of a million members to the opportunity of cooperating with similar clubs abroad. Over 500 clubs abroad are affiliated with Science Clubs of America.

Plans are being made to bring clubs in America and other nations into closer contact, through the UNESCO offices in Paris and otherwise. Materials being furnished USA clubs are being sent on request to clubs in other countries.

Science Clubs International, consisting of clubs in all parts of the world and their sponsoring organizations, is in the process of formation.

Science News Letter, November 6, 1948



MEDICINE

Nobel Award in Medicine Keynotes Internationalism

➤ AWARD of the Nobel Prize in medicine to Prof. Paul Mueller of Basel for his discovery of the insecticidal value of DDT reemphasizes what scientists all know but some of the rest of us may at times forget: the fact that science knows no national boundaries.

Prof. Mueller is a Swiss, and the Geigy Company for which he works is a Swiss firm. But DDT was first made by a German, Othmar Zeidler, in 1874. The prize money comes from the fortune left by a Swede, Alfred Nobel, who first made dynamite by mixing into an inert carrier the too-sensitive liquid high explosive, nitroglycerin, which was the discovery of an Italian, Ascanio Sobrero.

America figures in the story twice. The invasion of Europe by an American insect pest, the potato beetle, was one of the prime stimuli that set Prof. Mueller to searching for a more effective insecticide. Discovery of the value of DDT for this purpose, especially its effectiveness against body lice, came just in time to enable American Army sanitarians to suppress a typhus outbreak in Naples that might otherwise have become one of the worst horrors of the world's most horrible war.

The boundary-crossing benefits of DDT continue and increase. Its use to prevent disease-carrying insects from stealing intercontinental rides on aircraft and ships is now accepted routine. It also aids mightily the efforts of entomologists to prevent the spread of insect pests of cultivated plants and domestic animals. If it could only be used to delouse political heads of their crawling fears, suspicions and hatreds, the peace dream of Alfred Nobel might be measurably closer to realization.

Science News Letter, November 6, 1948

BIOCHEMISTRY

Bone Growth Studied with Radioactive Phosphorus

➤ BONE-MAKING processes in animals can now be studied more accurately through the use of radioactive phosphorus from atomic-fission piles. Newest advance along this line is reported in the journal, SCIENCE (Oct. 22), by Dr. Robert S. Siffert of Mount Sinai Hospital in New York.

Radioactive phosphorus can be fed to young animals in their diet instead of ordinary phosphorus. Its presence in the growing bones can be determined by removal of bones after the death of the animal, slicing thin sections from them,

and laying these on covered photographic films until the radiations affect the sensitive emulsion just as light rays would.

Softening the bone with acid previous to slicing is a necessary part of the process. Until now, a difficulty has been that ordinary acids, such as hydrochloric, take out so much of the phosphorus that a satisfactory picture cannot be made.

Dr. Siffert has solved the difficulty by using formic acid, which is a synthetic product chemically identical with the sharp-smelling material excreted by angry ants. This takes out the hard lumpy substance of the bone and leaves most of the phosphorus.

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PHYSICS

Spectral Analysis Method Detects Bits of Uranium

➤ VERY SMALL amounts of the atomic energy atom, uranium, can be detected by a new method of spectral analysis reported to the Optical Society of America in Detroit by Dr. L. T. Steadman of the University of Rochester.

Expected to be of use in measuring uranium present in many sorts of materials, the sample is burned in the crater of an electric carbon arc and the light given off is split into its spectrum lines by a quartz spectroscopic. The brightness of the uranium lines measured shows the amount of the metal present.

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METEOROLOGY

Fine Particles Carry Static Before Dust Storms

➤ RADIO-MESSING static runs ahead of dust storms by being carried on invisibly fine dust particles that outspeed the coarser grains, states Dr. E. W. B. Gill of Oxford University in the British scientific journal, NATURE (Oct. 9).

He observed this phenomenon as early as World War I, when he was in charge of a wireless station on the Salonika front. His aeriels would start sparking violently when a dust storm was approaching, well before the palpable dust actually arrived. At that time, however, he did not have an explanation to fit the observations.

In his laboratory at Oxford he was able to demonstrate the phenomenon on a small scale by pouring sand through a funnel and observing the behavior of an electrometer attached to a small metal plate nine feet away. The sand particles accumulated charges of static electricity by friction as they fell, but this had no effect on the instrument. Shortly after the sand had been poured, however, the electrometer indicator began to move. Dr. Gill attributes this to the arrival of the invisibly fine, charged dust particles spreading outward from the poured stream of sand.

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OTOLOGY

"Kick-Backs" on Hearing Aids Censured by A.M.A.

➤ "KICK-BACKS" are now being offered doctors on hearing aids as well as on eyeglasses, the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 30) reports.

Acceptance of such "kick-backs," or rebates, is strongly censured by the association.

Physicians in various parts of the country are being offered, and some have accepted, money from dealers for recommending particular makes of hearing aids, the journal reports.

"Such a transaction between the doctor and the dispenser of hearing aids constitutes a rebate and is in direct contravention of the stand of the American Medical Association in this matter," the journal states.

"It is degrading to the profession and commercializes the doctor who accepts such a 'kick-back.'"

The A. M. A. believes it is the dealers, not the manufacturers, of hearing aids that adopt this policy.

"A modified form of kick-back is the recent suggestion that a hearing aid dealer would sell only to patients whose ears had been examined by an otologist (a physician who specializes in care of the ears)," the journal points out. "The doctor's fee, according to this arrangement, would be paid by the hearing aid dealer. Presumably the cost would be passed on ultimately to the patient in the form of a higher price for his instrument."

Such an arrangement is also disapproved by the A. M. A. since it involves a payment from dealer to physician that might be interpreted or used as a "kick-back."

"To be beyond criticism in such a situation," the journal advises, "the payment to the doctor should be made by the patient himself, not by the dealer."

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PALEONTOLOGY

Turtle and Fish Fossils Dug Up in West

➤ FOSSIL BONES of sea creatures of 100,000,000 years ago were dug up in the West during the past summer and have been brought back to the Smithsonian Institution in Washington by Dr. D. H. Dunkle. Among them are the skull and jaws of a big sea turtle and the bones of several large fish that may have been distant cousins of today's tarpons.

These animals inhabited an ancient sea that stretched from Alaska to the Gulf of Mexico during Cretaceous time. Silts and sands of the old sea bottom, containing the bones dropped there when the animals died, have hardened into stone and been slowly raised to their present level, far from any ocean.

Science News Letter, November 6, 1948

BIOLOGY

Germless Animals Are Bred

The hatching of a germ-free chick from a germless laboratory egg conclusively proves that higher animals can live without microbes in the body.

By DR. FRANK THONE

➤ GERMS are not necessary to life in the higher animals. Birds can be hatched, mammals born, live their whole lives, mate and produce new generations of their kind, all without harboring within their bodies the swarming microbial gardens that have long been considered our inevitable, perhaps even our necessary, internal companions.

This has now been conclusively proved by experiments in the laboratories of bacteriology of the University of Notre Dame, carried out by Prof. James A. Reyniers and his co-workers. From germ-free parent bantam chickens they obtained a germ-free egg. From this egg they hatched a chick—also germ-free. Thus a whole germ-free life-cycle has been completed.

As long ago as 1885, Louis Pasteur, father of scientific bacteriology, pointed out that germ-free animals would be useful for experimental purposes. He speculated upon the possibility of producing germ-free chickens, but doubted if life without germs would be possible. The experiments at Notre Dame have shown this conjecture of Pasteur's to be incorrect.

Germ-Free Life

Earlier work by Prof. Reyniers and his colleagues had shown germ-free life to be possible for a wide variety of animals: mice, rats, guinea pigs, cats, monkeys, as well as chickens. Brought up inside aseptic metal cages, supplied with sterilized food and water and with filtered air to breathe, they remained healthy and contented indefinitely.

But they would not breed. When the mammals mated, no young were born. The chickens laid eggs—which did not hatch. So for a considerable while it was necessary to start each germ-free generation from scratch.

This is possible, though difficult and costly. It depends on one long-known biological fact: that chicks and other birds in their shells, as well as mammalian embryos wrapped in their pre-birth membranes, are normally germ-free. Prof. Reyniers developed an elaborate technique for completely aseptic caesarian operation to produce germ-free mammals. Germ-free chicks presented a simpler problem: sterilize the outside of the shells with suitable chemical solutions, then incubate them in sterile surroundings, and they would hatch out germ-free.

However, it would be better from the viewpoint of cost if germ-free animals

could be induced to reproduce their own germ-free offspring, living generation after generation in their carefully sealed-in world.

After many failures, the Notre Dame research group succeeded two years ago in obtaining second-generation germ-free rats. Now they have succeeded again, with chickens. The problem of repeating these successes on a large scale, to obtain any desired number of experimental animals without germs, is primarily one of engineering, and is already well on the way to solution.

Producing and breeding germ-free animals is more than an elaborate and interesting scientific stunt. There is a large field of possible usefulness for such animals, especially in the fields of experimental medicine and nutrition.

For instance, when a researcher has a new variety of germ which he suspects of causing a particular disease, he "puts it through a pig." That is, he injects some of the germs into a guinea pig, or gives it to the little animal in its food or water.

But the guinea pig is already full of other kinds of germs. If his suspected

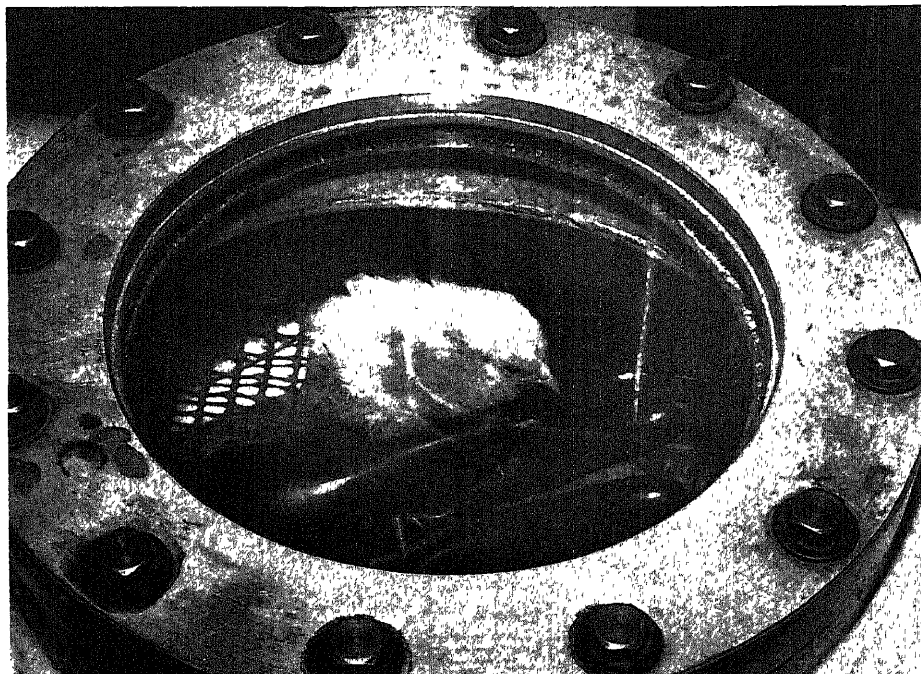
variety fails to have any effect, the experimenter cannot be quite confident in rendering a verdict of "not guilty." The possibility that the new germ's effects are offset by the action of a protective germ already present must always leave a shadow of doubt on his results. But if the experimental animal is germ-free to start with, this doubt can be resolved.

Vitamin Diet

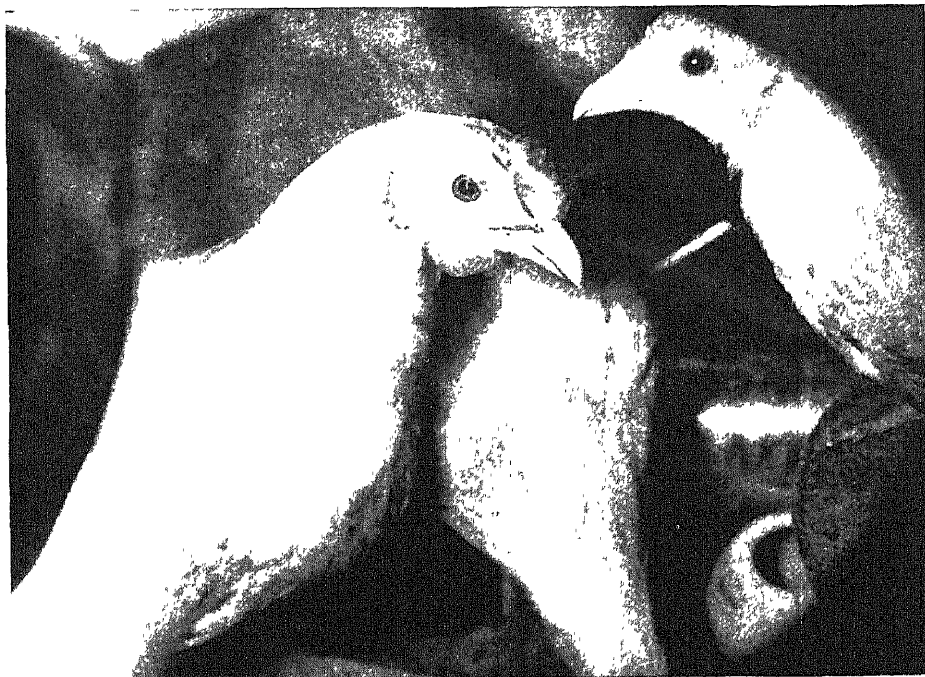
Again, if a nutritionist wants to test a newly discovered vitamin, he may feed a diet containing it (or lacking it) to a white rat. But the rat's digestive tract swarms with germs of a score or more varieties. Perhaps one or more of these will gobble up the vitamin before the rat gets a chance to assimilate it. Or perhaps some of the germs are themselves vitamin-makers—many germs are. The results again are masked, uncertain, unless the test is made with a germ-free animal.

These are only two of the many and varied possible uses of germ-free animals. Research workers from other universities have already beaten a path to the Notre Dame laboratory door. The Office of Naval Research considers the work to be of sufficient long-range significance for our national defense and health to justify the granting of considerable sums toward the partial support of the work.

The cages in which the germ-free ani-



GERM-FREE CHICKEN—Little Innocent is the first chicken to achieve the distinction of second-generation germ-free existence in the Notre Dame bacteriology laboratories.



COMPACT CHICKENS—One of these hens is the mother of Little Innocent. These Wyandotte Bantams make excellent laboratory animals because of their small space and food requirements.

imals are reared at present are hermetically sealed horizontal metal cylinders about the size of a popular washing machine, with germ-tight locks for the introduction and removal of the experimental animals. Windows for observation are gasketed into the wall, and long rubber gloves, similarly gasketed in, permit the operator to reach in and handle the animals without breaking the germ-tight seal. An elaborate network of pipes supplies sterile water, filtered air, and steam for resterilization of the cages between uses.

The new setup, now being prepared for larger-scale production of germ-free animals, is much more spacious, and will permit greater freedom of action on the part of the experimenter.

Nevertheless, space will always be at a premium, so the bacteriologists prefer to use small animals when there is no compelling reason for larger ones. Rats and guinea pigs are chosen rather than rabbits and monkeys.

For the same reason, Prof. Reyniers looked about for vest-pocket-size chickens when he decided to try for second-generation germ-free chicks. Bantams of the White Wyandotte breed proved to be an excellent choice. They not only require much less space than full-sized fowl, but they can live on much smaller portions of the semi-synthetic diet used in the experiments. It is expected that these feathered midgets will be widely adopted as experimental animals.

Science News Letter, November 6, 1948

MEDICINE

Eating May Heat Up Face

➤ EVERY TIME the patient ate, the left side of his face felt warm and sweat poured off it. The strange, one-sided reaction was brought on by eating any food, especially apples. This had been going on for 25 years.

This patient and two others with the same condition were studied by Drs. A. S. Freedberg, Robert S. Shaw and M. J. McManus of Harvard Medical School and Beth Israel Hospital in Boston.

Some patients with this condition get red on one side of the face as well as feeling

hot and sweating on that side. Auriculo-temporal syndrome is the medical name for the condition.

In the Boston patients, the reaction started in ten to 15 seconds after starting to eat an apple and while still chewing. In one of them, the same reaction was started by chewing a lemon or even paraffin.

Somewhat over 90 cases of this condition have been reported in medical literature and the Boston doctors point out that the condition is not rare and is repeatedly seen in clinics observing patients after

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Do You Know?

A little-known but increasingly important source of table oil is *okra seed*.

Average *potatoes* of today's favorite varieties contain about 15% starch.

Raw foods are good for the teeth because they help clean their surfaces.

Better *sizing*, or surface glaze, of paper results from the use of a new chemical called sodium phospho-aluminate.

Television will be available before the end of the year to the areas where half the people of the United States are living.

Some Maine *sardine canners* are using sunflower oil instead of olive oil because of the better taste.

An important advantage in the use of *magnesium piping* for transferring gasoline is that it will not strike a spark as ferrous metal will.

More than 30,000,000 pounds of *animal livers* are used annually for the production of medicines for the relief of anemia and other diseases.

One reason why *natural gas* is a preferred fuel in steel furnaces is that it contains almost no objectionable constituents and leaves no wastes or residues.

Eggs of fish and other eggs laid in the sea must be produced in enormous numbers if enough are to survive; one oyster sheds around 30,000,000 eggs in a single season.

A giant sound horn is to be tested at an airport to clear away *fogs*; sound waves will jar the fog particles into rain drops, it is expected.

Quartz tube lamps, filled with the rare gas *krypton*, emit beams that will pierce heavy fog for a thousand feet; they are used on the approach lighting system of the new Idlewild airport on Long Island.

operation on the parotid gland.

Mumps or other infection of the parotid gland as well as operation on it may start the condition. The one-sided sweating while eating is noticed within a few days to three years after the original gland involvement and lasts the rest of the patient's life.

Most likely explanation, the Boston scientists believe, is that the facial sweat glands in contrast to the rest of the body have two

sources of nerve supply. When one is injured the other may become active and indeed overactive.

Relief of severe sweating and flushing may be obtained, the Boston scientists suggest, by alcohol injection or surgical cutting of the auriculotemporal nerve. Details of their studies leading to this suggestion appeared in the JOURNAL OF CLINICAL INVESTIGATION (Sept.).

Science News Letter, November 6, 1948

MEDICINE

Siamese Twins Studied

➤ MARY and Margaret, Siamese twins who have furnished entertainment to circus goers, are now giving doctors new light on the cause of high blood pressure.

At the age of 34 Margaret developed high blood pressure, grade 2. Mary had normal blood pressure at rest, although it was unstable and went up at times, though never as high as Margaret's. Detailed studies of these unique sisters are reported by Drs. Stewart H. Jones, Omar Z. Young-husband and James A. Evans, of the Lahey Clinic in Boston, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 30).

The twins are joined at the hips. Their spinal canals communicate. Discovery of this when they were three years old led doctors at that time to decide against trying to separate them by an operation.

The question of separating them now was settled by the twins themselves who flatly refused even to consider it. They feel such a separation would be like having an arm or leg cut off. And the surgeons and orthopedic specialists who examined them at the age of 34 agreed that such an operation was not feasible.

Tests with injections of dyes showed that their blood vessel systems communicate but the degree of exchange of blood in their veins was not determined exactly. It appeared to be moderate.

Mary's slight and Margaret's more severe

high blood pressure could be hereditary, since their mother has high blood pressure. Or it may be a result of chronic kidney infection, since Margaret has kidney stones and a past history of kidney infection. A blood-pressure-raising substance from Margaret's diseased kidneys might travel via the blood communication to Mary and raise her blood pressure slightly.

Margaret is a thin, high-strung, nervous type of person, while Mary is stout, calm and placid. Their intelligence quotients are the same but personality tests showed Margaret tending more toward the neurotic than Mary. Margaret's more exaggerated response to a test for blood vessel tone suggests that chronic anxiety and nervous tension probably play more of a part in causing her high blood pressure while in Mary the hereditary and blood chemical factors probably predominate.

Female sex hormones and temperature-raising substances in fevers associated with infections also travel via the blood stream, studies of the twins showed.

Emotional states apparently are not spread by way of the circulation.

Siamese twins, the doctors conclude from their studies of Mary and Margaret, probably develop from two separate ova and not, as frequently supposed, from a single ovum, or egg cell.

Science News Letter, November 6, 1948

MEDICINE

Irritation from Smoking

➤ THE THROAT irritation caused by smoking cigarettes cannot be told from the irritation caused by various bacteria, chemicals and heat, the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 30) states in an editorial.

"It would be a wise physician indeed who could differentiate" between the two, is the way the journal puts it.

Cigarette advertising on the basis that the product advertised does not irritate the throat is "approaching a point where the advertising is no longer significant," the journal states.

Besides the impossibility of telling wheth-

er the throat irritation is due to cigarettes or to something else, the methods for measuring throat irritation are not standardized.

"Further truly scientific studies and respect for intelligent advertising," the journal says, would do away with the need for more trials before the Federal Trade Commission to determine whether cigarette advertising claims are justified or not.

The manufacturers of cigarettes are reminded by the journal of the "trend in the promotion of alcoholic liquors and their abuse" which finally led to prohibition. Re-

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strictive legislation against cigarettes may come, the journal warns, unless the industry undertakes voluntary policing restriction.

The A. M. A. JOURNAL, like many other medical publications, carries cigarette advertising. This brings in about a dozen protests per year from physicians. On the health aspects of cigarette smoking, the journal says the following:

"Actual surveys indicate that the majority of physicians themselves smoke cigarettes. Extensive scientific studies have proved that smoking in moderation by those for whom tobacco is not specifically contraindicated

does not appreciably shorten life. Post-mortem examinations do not reveal lesions in any number of cases that could be definitely traced to the smoking of cigarettes. From a psychologic point of view, in all probability more can be said in behalf of smoking as a form of escape from tension than against it. Several scientific works have been published that have assembled the evidence for and against smoking, and there does not seem to be any preponderance of evidence that would indicate the abolition of the use of tobacco as a substance contrary to the public health."

Science News Letter, November 6, 1948

DENTISTRY

Mouthwash Cuts Decay

➤ A MOUTHWASH has been devised by a Philadelphia dentist that has reduced dental decay on an average of 75% in a group of his patients.

Formula for this caries-preventive is: 40 grams of sodium alkyl aryl sulfonate, a synthetic detergent; 80 grams of carbamide or urea; one-eighth of an ounce of flavoring; and one grain of color to one gallon of pure water.

Dr. David J. Goodfriend, in a report to the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (Nov. 1), states that the mouthwash cleans the teeth and penetrates between them where food particles may be lodged, prevents the formation of decay-producing acid in carbohydrate food particles and neutralizes acids that may be formed.

For the home care of the mouth and teeth he recommends that a mouthful of the mouthwash be swished around and between the teeth for one minute after eating and after toothbrushing.

The mouthwash stops bleeding in addition to its preventive action. Dr. Goodfriend points out this is an aid to dental surgical procedures.

"In a manner which I do not understand," he states, "it will stop bleeding without soiling or contaminating the field

as most hemostatic agents do. Held in the mouth for three to five minutes after tooth extraction, it usually completely controls bleeding and leaves an uninjured wound full of clotted blood. Sprayed on bleeding gingivae (gums) during scaling or cavity preparation, it controls the bleeding and cleans the operative field."

Dr. Goodfriend discovered the effectiveness of his mouthwash after treating 186 of his patients who were especially susceptible to tooth decay. They had abnormalities of bite which required that fixed bite overlays be placed on the teeth for from six months to two years. This device collected many particles of food which encouraged dental decay.

For contrast, Dr. Goodfriend compared the 186 patients receiving the mouthwash with a group treated for the same condition without the mouthwash. In the first group the incidence of caries was reduced by 55% to 95%. "In the control group there was such a high incidence of caries that it interfered with treatment of the bite and frequently caused the loss of teeth," he points out.

This work was done under the auspices of the Edward C. Kirk Research Fund of the University of Pennsylvania.

Science News Letter, November 6, 1948

METEOROLOGY

Rain-Making with Fire

See Front Cover

➤ SILVER IODIDE smoke particles, created by fire in special burners, give promise as tools for artificial snow and rain makers. In this they may replace dry ice and other substances successfully used during the past year.

Artificial snow-making by the dry-ice method is actually two years old but was first a laboratory process. Later snow was made in super-cooled clouds high above the earth by distributing in them finely-divided

solidified carbon dioxide particles from an airplane. The particles become the nuclei of snowflakes.

The experiment has been tried out several times during the past year in various parts of the United States and under various weather conditions. A degree of success was achieved. Other materials besides dry ice have been tried but this is probably the first time that fire has been employed to generate smoke for snow-making.

The dry-ice method of making artificial snow is credited to Dr. Vincent J. Schaefer,

SCIENCE AT WAR

By J. G. CROWTHER

Chairman, Association of British
Science Writers

and

R. WHIDDINGTON

Head, Dept. of Physics,
University of Leeds

THE first detailed account of science's contribution to the war effort, based on the official archives and documents assembled by the Scientific Advisory Committee to the British Cabinet. Because of the close and intimate collaboration between the American and British forces during World War II, this volume is of fundamental interest to the American scientist, as well as to the intelligent layman interested in science.

Although the use of science as an aid to war is a perversion from its proper purposes, we may find reassurance in recognizing that much of the discovery and invention which came to hand in response to the recent war demands will find immediate and beneficent uses in peace.

Among the basic topics dealt with in this book are: *Radar, The Atomic Bomb, Operational Research, Science and the Sea, Submarine Detecting, Under Sea Observations, The Magnetic Mine, Underwater Explosions, War Diving, etc.*

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General Electric scientist. The silver iodide technique is the work of Dr. Bernard Vonnegut, shown on the cover of this week's SCIENCE NEWS LETTER, also of General Electric. His generators for the smoke particles have been laboratory tested thus far, but they are expected to undergo extensive experimentation in actual weather conditions in the near future. The air tests will be made by the U. S. Army Signal Corps and the Office of Naval Research. Among the silver iodide smoke generators developed are two charcoal-burning units, one for use on the ground and one for use on a plane, and a hydrogen-burning

unit. The charcoal burners use a special charcoal impregnated with silver iodide and emit thousands of sparks, each of which produces millions of silver iodide particles.

The ground-based hydrogen burner is described as similar to an ordinary paint sprayer, except that hydrogen is used instead of compressed air and a spray solution of silver iodide and sodium iodide in acetone is substituted for the paint. When the hydrogen is ignited, the flame vaporizes the silver iodide spray. This vapor condenses into minute silver iodide particles, which stream out into the atmosphere.

Science News Letter, November 6, 1948

GENERAL SCIENCE

Young Scientists Wanted

MORE THAN 50 industrial scientists are joining in a statewide search for science-talented boys and girls in Virginia. The industrial scientists will go directly to high schools in the state to find seniors who show promise of becoming scientists and give them first-hand encouragement and assistance.

Dr. Frank C. Vilbrandt, head of the department of chemical engineering at the Virginia Polytechnic Institute in Blacksburg, Va., announced that prominent scientists may be secured as speakers for school assemblies or science club meetings from such industrial firms as Newport News Shipbuilding and Dry Dock Company, Virginia-Carolina Chemical Corporation, Merck & Company, Inc., American Viscose Company, Norfolk and Western Railway Company and from the laboratories of Virginia Polytechnic Institute, Hollins College and the University of Virginia.

This latest innovation in locating science talent is part of a long-range program of the Virginia Academy of Science which is conducting a Virginia Science Talent Search for the fourth consecutive year. The dozens of able boys and girls, thereby located and given financial assistance to further their education in science, have aroused the interest of many colleges, universities and industries in the state. Other companies and institutions which will supply speakers will be announced later.

Boys and girls still in high school can now hear up-to-the-minute information about such subjects as atomic energy, insects, penicillin, photosynthesis, ultrasonics, genetics or fiber photomicrography. Many of the speakers will use slides, films or demonstrations. For students who want vocational guidance their principal may request a speaker to explain "How to Select a Scientific Profession," "What Industry Expects of a Chemist" or "Job Possibilities for Scientists in Virginia."

Dr. Sidney Negus, president of the Virginia Academy of Science, declared, "Finding and helping the boys and girls with science talent is the most important work of our Academy." Dr. Negus is one of the originators of the State Science Talent Search plan tried first in Virginia and now being copied by 15 other states.

All state Searches run concurrently with the Eighth Annual Science Talent Search by the Westinghouse Science Scholarships by special arrangement with Science Clubs of America, administered by Science Service. The closing date for entries in the state and National Science Talent Searches is Dec. 27, 1948.

Science News Letter, November 6, 1948

MEDICINE

"Sound-Conditioned" Cats Aid Treatment of Disease

"SOUND-CONDITIONED" monkeys and cats may help toward better treatment for Meniere's disease.

This condition is characterized by attacks of violent dizziness, which are often disabling, and gradual loss of hearing with noise or ringing in the ear. Medical treatment is often tried for this condition. It can be cured by an operation in which the vestibular branch of the hearing nerve within the skull is divided. This branch of the nerve carries impulses of equilibrium from the semicircular canals within the ear. After this operation, the dizzy attacks are banished and the hearing may be defi-

nately better but it is not always completely restored.

A simpler operation is one in which the electrocautery is used to destroy parts of the semicircular canals. This, however, destroys hearing in most cases. With the aid of the sound-conditioned animals, Dr. John R. Lindsay of the University of Chicago is now trying to refine this operation to the point where hearing can be saved but the canals destroyed to banish the dizzy spells. He described his studies to the American Academy of Ophthalmology and Otolaryngology meeting in Chicago.

The animal is trained, or conditioned, to associate each of a series of pure tones with an event such as a puff of wind that ruffles its fur or a mild electric shock that causes it to lift a paw. When the conditioning is complete, an operation is performed like that intended for human ears. The sound-conditioned animal then can tell the surgeon how much hearing, and for what tones, has been saved.

Science News Letter, November 6, 1948

MEDICINE

Vitamin B₁₂ Promising in Anemia Complication

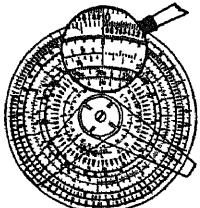
HOPE that a vitamin may remedy the spinal cord complication of pernicious anemia appears in results of research by Drs. Tom Spies and Robert E. Stone of Northwestern University Medical School, Chicago.

The vitamin, B₁₂, has been recently isolated and is still hard to obtain. The amount available is so small that complete evaluation of its effectiveness cannot yet be made and the studies are still going on.

So far Drs. Spies and Stone have been able to treat only seven patients with it. But in all seven symptoms improved and some of the abnormal physical findings were reversed.

The condition for which this vitamin shows promise is known medically as subacute combined degeneration of the spinal cord. Symptoms include great pain, tingling and numbness of feet, legs, fingers and arms, and finally paralysis. No other chemical substance has ever given relief from it.

Science News Letter, November 6, 1948



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Books of the Week

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THE AUTOBIOGRAPHY OF BENJAMIN RUSH: His "Travels Through Life" together with his Commonplace Book for 1789-1813—George W. Corner, Ed.—*American Philosophical Society (Princeton University Press)*, 399 p., illus., \$6.00. An important historic document is this compilation of the writings of a notable patriot and physician whose thirst for knowledge in widely varied fields caused him to set down a tremendous number of interesting facts.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE: A Brief History of the Association From Its Founding in 1848 to 1948, Its Present Organization and Operation, Summarized Proceedings for the Period from January, 1940 to January, 1948 and a Directory of Members as of December 31, 1947—*AAAS*, 1219 p., \$8.50 members, \$9.50 non-members.

THE CITRUS INDUSTRY, VOLUME II: PRODUCTION OF THE CROP—Leon Dexter Batchelor and Herbert John Webber, Eds.—*University of California Press*, 933 p., illus., \$10.00. A book for fruit growers with each chapter written by an author with special knowledge of the subject.

THE CYTOPLASM OF THE PLANT CELL—Alexandre Guillaumond—*Chronica Botanica*, 247 p., illus., \$5.00. The work of a French author translated by Dr. Lenotte Rogers Atkinson.

MAGIC IN A BOTTLE—Milton Silverman—*Macmillan*, 2d ed., 386 p., \$3.50. Romantic stories behind the development of modern drugs and remedies.

MANUAL OF ARCHAEOLOGICAL SURVEYING—A. Henry Detweiler—*American Schools of Oriental Research*, 129 p., illus., \$1.75. A reference work for archaeologists and excavators which will enable them to express their descriptions of findings with greater exactness and to understand one another.

MARCHING WITH THE GRASSES—Raymond J. Pool—*University of Nebraska Press*, 210 p., illus., \$3.50. Much of the food that we depend on for life is derived from grass. This work is intended to give the general reader an appreciation of the vital and global importance of the grasses.

ORGANIC REACTIONS, VOLUME IV—Roger Adams, Ed.—*Wiley*, 428 p., \$6.00. This is a standard work issued in succeeding volumes, each chapter written by an expert and giving a comprehensive survey of a particular reaction.

PHYSICO CHEMICAL EXPERIMENTS—Robert Livingston—*Macmillan*, rev. ed., 267 p., illus., \$3.50. A text for courses in physical chemistry. The revision involved no major changes.

PLENTY OF PEOPLE: The World's Population Pressures, Problems, and Policies and How They Concern Us—Warren S. Thompson—*Ronald*, rev. ed., 281 p., illus., \$3.50. The director of the Scripps Foundation for Research in Population Problems believes that England, Germany and Italy already have more people than is desirable, while China, Japan and India as well as other parts of Asia can only look forward to the most dis-

tressing poverty until they learn to control their population growth.

PROJECTIVE TECHNIQUE: A Dynamic Approach to the Study of the Personality—John Elderskin Bell—*Longmans*, 533 p., \$4.50. A text and reference book covering word-association tests, Rorschach, TAT, Rosenzweig, Szondi, psychodrama and other modern methods of studying personality through projective techniques.

THE ROLE OF UPROOTED PEOPLE IN EUROPEAN RECOVERY—Jane Perry Clark Carey—*National Planning Association*, 85 p., illus., paper, \$1.00. Accompanied by a "Program Guide for Discussion" prepared by the American Friends Service Committee.

THE STORY OF BLOOD—John H. Glynn—*Wyn*, 285 p., \$3.00. A popularly written book by a bacteriologist.

TUBEROUS BEGONIAS: A Complete Guide for Amateur and Specialist—Worth Brown—*Barrows*, 128 p., illus., \$2.75. Especially for the home gardener and enthusiast.

Science News Letter, November 6, 1948

MEDICINE

Cancer Remedies May Come From Natural Compounds

➤ ONE KIND of cancer in rats can be made to regress within a week by chemicals extracted from malt extract and wheat middlings, Drs. T. B. Heaton and G. M. Robinson of the University of Oxford announce in the British scientific journal, *NATURE* (Oct. 9).

Their report does not suggest any application to human cancer. American cancer researchers point out that any number of compounds will slow down the growth of cancers in laboratory animals, but such compounds have proved disappointing as possible remedies for human cancer.

Hope continues, however, that some naturally occurring compound, from plant or animal sources, may prove effective against this disease.

The chemicals from wheat and malt may be the same. The wheat middlings one can be converted to another chemical of the aldehyde class. All three of these, in small doses, stop the growth of rats. This effect starts as soon as the chemical is given and stops as soon as the scientists stopped giving the chemical.

But when the chemicals are given in the much larger dose necessary to cause the cancer to regress, they do not stop the growth of the rats. On the contrary, the chemicals seem in the big doses to speed growth in terms of weight gains.

It was the growth-arresting effect of various substances from plants and yeast and of some pure chemicals which years ago started the scientists on their search.

Science News Letter, November 6, 1948

A New Book
on the
Ever Important Question of

MINERAL NUTRITION OF PLANTS AND ANIMALS

By Frank A. Gilbert
Battelle Memorial Institute

WHAT causes low crop production, abnormally developed plants? "Hairless" hogs? Lean livestock? How can men eat "good" meals—and still be undernourished? Animals cannot be healthy without receiving nutritious forage; and the forage, to have the proper quality, must come from soil containing the needed mineral constituents, as must all plants used for food—the final consideration being their nutritive value to man. Mineral deficiencies in human beings—which often lead to the condition described as "hidden hunger"—result from the consumption of this inadequately fortified food, vegetable, animal, or both.

This survey discusses many books and articles dealing with mineral nutrition and is a noteworthy addition to the mounting literature on the values of trace elements to plants and animals. It classifies mineral elements in nutrition and presents a sketch of the early history of plant nutrition—from Aristotle to Liebig. An important adjunct to source material in the field of nutrition, it serves as a foundation for more intensive research in seeking better food for the health of the nations. Fully documented with illustrations and an excellent bibliography.

CHAPTERS

Early History of Plant Nutrition
Classification of the Elements Used
in Nutrition

Phosphorus	Iodine
Calcium	Boron
Magnesium	Molybdenum
Potassium	Aluminum
Sulfur	Silicon
Iron	Sodium and
Copper	Chlorine
Cobalt	Fluorine
Manganese	Arsenic, Lead,
Zinc	and Selenium
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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 439. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **WARM-AIR FURNACE**, a coal burner that can be easily converted for firing with gas or oil, has a stainless steel combustion chamber and is one of the first coal-fired heaters to use this material which increases service life. Blowers and an induced draft fan for the heater are mounted on a single shaft, powered by a single motor.

Science News Letter, November 6, 1948

⚙️ **BLOOD COUNT MICROSCOPE**, which automatically counts red and white blood cells and hemoglobin with speed and accuracy, is a simple instrument that can be operated without special training or technical knowledge. A photoelectric eye counts and averages all the corpuscles on a given area of the counting chamber and records the results on a meter.

Science News Letter, November 6, 1948

⚙️ **SPECIALTY TOOL**, for hard-to-reach parts and places, consists of a flexible cable shaft encased in a flexible housing tube which can be curved as desired to work around corners or S-turns. The shaft has expanding and retracting fingers, operated by thumb pressure applied at the opposite end, to grip a hard-to-get-at object.

Science News Letter, November 6, 1948



⚙️ **SELF-BREATHING APPARATUS** for firemen, shown in the picture, is for use in smoky fires and gas-filled rooms where oxygen is not otherwise available. The breathing bag, which fits over the chest, contains a canister of potassium tetraoxide

which generates oxygen when activated by moisture from the breath.

Science News Letter, November 6, 1948

⚙️ **SELF-OPENING VALVE**, for use on aviator's oxygen cylinders, permits the oxygen line to become pressurized immediately when the valve is attached. Flow is regulated by a control valve in the line near the pilot. When the coupling is disconnected from the cylinder valve, oxygen flow is automatically cut off.

Science News Letter, November 6, 1948

⚙️ **MEASURING INSTRUMENT** for lacquer deposits on engine pistons contains two high-voltage terminals, one of which is attached to the piston and the other placed touching the lacquer deposit. The instrument measures the amount of voltage required to burn through the lacquer.

Science News Letter, November 6, 1948

⚙️ **NON-TIPPABLE "WALKER,"** an improved type designed to help disabled patients learn to walk, has a wide metal frame with adjustable arm-rests and is so built that a patient can maneuver his wheel-chair into position and pull himself up to a walking position without help.

Science News Letter, November 6, 1948

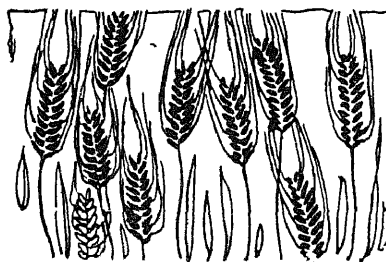
• Nature Ramblings by Frank Thone •

➤ **PRACTICALLY** all of the plants we depend on to supply staple foods for ourselves, feed for our animals and fibers for clothing and other fabrics complete their life cycles from planting to harvest in a single growing season. All the grains, most vegetables and all melons, as well as sugarbeets, soybeans, cotton and linen are annual crops.

There are certain definite advantages to this year-by-year farming. For one thing, it offers flexibility in planning, for the farmer who has a choice of crops to grow and a rotation schedule to maintain does not need to commit any given field for more than one season at a time. Also, since our principal foods are either seeds, roots or tubers, it is natural to turn to plants that produce these in largest quantity, and these plants are either annuals like the grains and legumes or biennials like sugarbeets and cabbage, that are harvested before they finish their life cycles.

However, there is one great offsetting

Needed: Perennial Crops



disadvantage to year-by-year farming—so great that it has become an agronomic nightmare. These crops that have to be planted every year naturally require that the soil be plowed every year, and in many cases also demand several surface stirrings afterwards, to kill competing weeds. This means soil that is naked or nearly so almost all the time, inviting deadly erosion by wind and water.

It would be a great advantage if some of our staple crops could be perennials like the grass in our best pastures. A few of our hay crops are, notably alfalfa; but these are usually handled on a relatively short-term basis, not more than three or four years from planting to plowing-up, as a rule.

Perennial wheat varieties have long been a goal of agronomists. Usually the effort to obtain them is made by crossing a winter wheat with a related longer-lived wild grass such as quackgrass. Such crosses made in this country and Canada have resulted in hybrids more valuable as range grasses than for grain. Just before the war two Soviet breeders named Tsitsin and Derzhavin reported production of short-lived perennial (triennial) wheat varieties with good grain yield. What happened to these is not known; perhaps the war interfered with their general distribution. At any rate, the main wheat crop, in Russia as elsewhere, is still on the old year-to-year basis.

Science News Letter, November 6, 1948

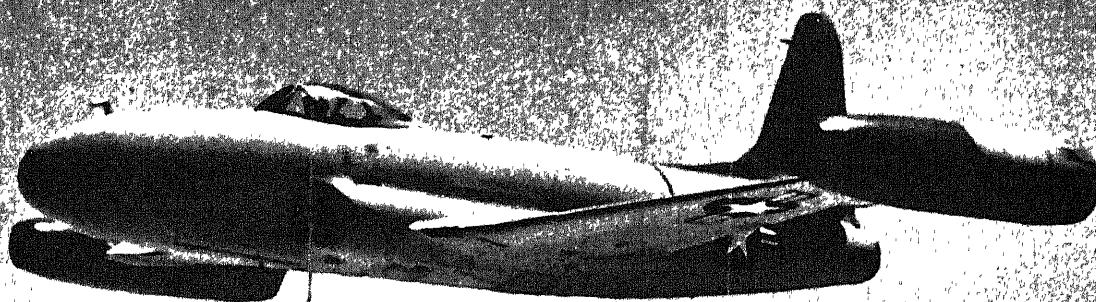
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November 13, 1948

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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See Page 313

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VOL. 54 NO. 20

MEDICINE

Artery Disease Attacked

Nerve-cutting operation which relieves complications in arteriosclerosis and chemical investigation of the cause of the condition are reported.

➤ **ARTERIOSCLEROSIS**—hardening of the arteries to you—is now under attack by both chemistry and surgery. From the chemical front may come knowledge of what makes artery walls grow hard and lose their elasticity. Following this might come a diet to prevent the condition.

From the surgical front comes a nerve-cutting operation that relieves some of the late complications of hardened arteries, such as gangrene and amputation. Progress on both fronts was reported at the meeting in Chicago of the American Society for the Study of Arteriosclerosis.

A 70% salvage rate two years after the nerve-cutting operation was obtained for 83 patients, Drs. Alexander Blain III, Kenneth N. Campbell and Bradley M. Harris of Detroit and Ann Arbor, Mich., reported.

The operation not only spared these patients amputation with consequent physical and economic disability but had a prophylactic effect in another group with early arteriosclerosis which was causing such symptoms as night cramps, cold hands and feet and intermittent claudication. All of this group got complete relief of symptoms.

The nerves which are cut are part of the sympathetic nervous system which operates independently of the brain and controls, among other things, the contracting and dilating of blood vessels. Object of the operation is to lessen the tendency toward spasm of the small blood vessels which occurs in arteriosclerosis. These blood vessels can often then carry enough blood to the legs, hands and feet to prevent symptoms of poor circulation from coldness to gangrene.

Among 24 patients who had already developed some gangrene 17 were improved by a nerve-cutting operation, Drs. Leon Gerber, William S. McCune and William Eastman of Washington, D. C., reported. In the remaining patients the operation failed and gangrene progressed so that amputation was necessary.

A disturbance in the way the body handles fatty substances, specifically fatty acids, from food is now suspected of a fundamental part in starting artery damage, with the kidneys playing an important role in this fat-handling disturbance.

Diet experiments arousing this suspicion were reported by Dr. Russell L. Holman of Louisiana State University School of Medicine.

Dogs, he found, can eat a diet with lots of fat in it without ever getting artery damage unless the kidneys are damaged. But any time after two months of such a diet kidney damage is regularly followed by

artery damage, experiments showed.

The chemical injury comes before anatomical change. Dr. Holman's studies also suggest that development of artery disease may be a matter of days rather than decades and that the effects of age may be more cumulative than causative.

Fatty substances in the blood called lipfanogen and antilipfanogen are believed to

VETERINARY MEDICINE

"X" Disease Killing Cows

➤ **"X" DISEASE**, so called because it is still a totally unknown quantity so far as its origin is concerned, is killing cattle in at least 32 of the states of the Union, declares Dr. H. W. Schoening, U. S. Department of Agriculture veterinarian in charge of pathological studies.

No section of the country is free from it, since the states where it has been reported are distributed all over the map. It is not at all unlikely, Dr. Schoening added, that it may be occurring in other states but has not yet been reported from them because it has not been recognized.

Symptoms are described as including loss of weight and appetite, decrease in milk yield, premature dropping of calves, fever, and a thickening and inflammation of the skin. No drug treatment thus far attempted has been successful. Of animals contracting the disease, nearly 60% die. It is a long and lingering affair, with the poor beasts dragging themselves around in an emaciated state sometimes for weeks or even months before they die.

One particularly marked symptom of X disease has become the basis of a more technical name, hyperkeratosis. This combination of Greek roots means "overgrowth of horn." It does not, however, refer to the animals' horns but to the enormous thickening of the horny outer layer of the skin, which is thrown into heavy wrinkles and folds.

How hard X disease can hit cattle owners was disclosed in a survey just concluded in five states of the Southeast, conducted by four outstanding research men. In 26 herds, totaling over 4,000 head, more than 30% of the cattle were affected, and nearly 60% of these died. Losses were estimated at more than \$110,000, or over \$4,200 per herd. Beef cattle were much more frequently affected than dairy types.

Suggested possible causes include infection with virus, fungus or other disease

play a part in the production and control of one kind of artery hardening, atherosclerosis, Drs. Henry S. Simms, Mary S. Parshley, Ruth B. Pitt and Joan B. Fulton of Columbia University College of Physicians and Surgeons told the meeting.

Lipfanogens are taken up by living cells and converted into visible fat. Antilipfanogens prevent this conversion. Blood from patients with kidney and heart diseases and diabetes, which are frequently complicated by hardening of the arteries, has somewhat less than normal lipfanogen activity and considerably less than normal antilipfanogen activity.

Dr. Kenneth B. Turner of Presbyterian Hospital, New York, cooperated with Dr. Simms and associates in these studies.

Science News Letter, November 13, 1948

GENETICS

Bacteria Found Convenient For Heredity Studies

➤ **BACTERIA** are being found convenient organisms for the study of mutations, or sudden hereditary changes. In the number of generations they produce in a given time, as well as in the small space they occupy and the low cost of feeding them, they put rabbits and even fruit-flies completely in the shade.

Reports of two types of bacterial mutation are presented in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Sept.). The first comes from Dr. Francis J. Ryan of Columbia University. He has found in cultures of lactic-acid-producing bacteria new strains that can get along without certain of the amino acids, or protein building-blocks, which the original ancestral species always required for living. Typical is a new strain able to get along without the common amino acid, histidine.

The other report is by Dr. E. Ruth Witkus of Fordham University. Her bacterium is a species that is normally yellow, but which has several times produced white variants which are stable, never reverting to yellow no matter how long their cultures are carried on. The curious thing is that this white mutant strain can be produced only through the cooperation of four other, and quite different, bacterial species in a mixed culture.

Science News Letter, November 13, 1948

MEDICINE

Pill Checks Gonorrhea

A single pill of penicillin a few hours after exposure will prevent this venereal disease, it was discovered in tests made on Navy personnel.

► GONORRHEA can now be prevented by swallowing a single pill of penicillin within a few hours after exposure, Dr. Harry Eagle of the National Institutes of Health, U. S. Public Health Service, reported.

This may herald the conquest of one of the two major venereal diseases. The famous mold remedy has already proved its power to cure cases of gonorrhea. With an easy means of prevention now available, the chain of infection could be broken and the disease may in time be practically wiped out.

The tests showing the mold remedy's preventive power were made on Navy personnel. Associated with Dr. Eagle in the studies, reported in detail in *PUBLIC HEALTH REPORTS* (Oct. 29), were Lieut. (jg) A. V. Gude and Lieut. (jg) G. E. Beckmann, reserve officers in the Navy Medical Corps; Dr. George Mast, commander in the Navy at the time of the studies; Capt. J. J. Sapero of the Navy Medical Corps; and J. B. Shindledecker, chief hospital corpsman, U. S. Navy.

The penicillin pills used were the ordinary penicillin G mouth tablets made by eight different firms and now available on doctor's prescription. The pills were taken an average of two hours after exposure to gonorrhea. If taken as long as 12 to 18 hours after, it might be necessary to take two pills six hours apart, but this is not definite.

No complications which might work against the general use of penicillin pills for prevention of gonorrhea have appeared so far in the tests involving several hundred men. In the first 16 weeks of the study, the pills were taken as often as five times a week, with an average of slightly over once a week.

No sign of sensitization to penicillin has developed. The germs causing gonorrhea have apparently not developed resistance to the mold chemical. And there has been no case of simultaneous syphilis being suppressed by the preventive pill, only to flare up later as has occurred in penicillin treatment of gonorrhea.

The penicillin tablets were given, one tablet per man, to from 151 to 213 men as they returned to ship from shore liberty. The tablets given these men contained 100,000 units of penicillin. In the group there were five cases of gonorrhea over a 16-week period. In three cases there was reason to doubt that the men actually received penicillin.

Men in another group of approximately the same size, varying from 137 to 217,

each got a placebo tablet that looked like penicillin but contained none of the mold chemical. In this group there were during the six-month period of the test 43 cases of gonorrhea, a rate of 11.9 cases of gonorrhea per 1,000 liberties with a sickness rate of 508 cases per 1,000 men per year.

In the group that got the 100,000 unit penicillin tablet there were 1.8 cases of gonorrhea per 1,000 liberties and an average sickness rate of 105 per 1,000 men per year.

When the penicillin-treated group had their dose stepped up to 250,000 units in a single tablet, during an eight-week period only one case developed among from 87 to 141 men taking 569 liberties. In that case the man said he had not taken the penicillin pill.

The 250,000 unit penicillin pills were then made available to the entire station on a voluntary basis. During an eight-week period, involving 225 men and 1,943 liberties, seven cases of gonorrhea developed. Of these, six were in men who did not request the penicillin pills on returning from liberty. The seventh developed a week after the man received the pill, but during

this week the man had been A. W. O. L. for five days with repeated exposures to gonorrhea.

Science News Letter, November 13, 1948

ENGINEERING

Improved Seismic Method Of Locating Oil Revealed

► AN IMPROVED method of locating probable underground petroleum deposits by the so-called seismic method was revealed by the Institute of Inventive Research, San Antonio, Texas. It is the work of Dr. Thomas C. Poulter, and utilizes "shaped charges" of explosive compositions which are set off above the ground, thus eliminating the cost of drilling shot holes.

Shaped charges go back to what physicists know as the "Munroe effect" which was announced to the world in 1888 by Prof. Charles E. Munroe. He found that if a hollow is made in an explosive cartridge on the side toward the object to be blasted, the effect is greatly increased. The hole can be conical or hemispherical in shape. The principle was well applied during the war in the bazooka rocket, which was far more effective in piercing armor plate than bullets.

In the seismic method of locating probable oil deposits under the earth, a seismograph similar to that used in observatories to record earthquake tremors is employed. But the tremors are man-made, and are rather minor. An explosive is detonated in a drill hole, the depth of which varies in



SEISMIC OIL EXPLORATION—Picture shows night explosion of 13-charge detonation covering 120-foot area. This new, above-ground explosion method is expected to be cheaper than conventional methods and to speed up search for oil.

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different locations. Shock waves travelling downward deep into the earth are reflected back by certain structures if encountered. Experts, from a study of the recordings made by these reflected shock waves, are able to determine underground layers favorable to petroleum deposits.

Dr. Poulter's new method will provide economy in eliminating the need of boring holes, and it can be used in regions where boring would be exceedingly difficult, as in isolated mountainous country or in a search for oil under the sea. Dr. Poulter, who is associate director of Stanford Research In-

stitute of Palo Alto, Calif., has tested his method against conventional procedures in various locations.

In his procedure, the charges in the explosive pattern are set on stakes relatively close to the ground and spread in a hexagonal design. Depending upon the type of records sought, comparatively light charges are placed from five to 85 feet apart and detonated simultaneously. The method may be used to produce an essentially flat wave front of low amplitude over a relatively large area.

Science News Letter, November 13, 1948

MEDICINE

New Way To Treat TB

➤ A WAY to improve streptomycin treatment for tuberculosis and bring its benefits to patients suffering from the very common, late type of the disease, fibrocascous tuberculosis, has been discovered by Drs. Edgar Woody, Jr., and Roy C. Avery of Vanderbilt University School of Medicine, Nashville, Tenn.

The method is to give the famous mold remedy with another medicine, potassium iodide. The streptomycin would be given by hypodermic injection and the iodide in drops to be swallowed in water.

Success with this treatment in tuberculous guinea pigs is reported by the Vanderbilt scientists in the journal, *SCIENCE* (Nov. 5). The guinea pigs were all infected with the same dose of TB germs. It was a big enough dose to kill all the untreated animals. Of those treated with streptomycin alone, 46.1% died. Of those treated with streptomycin plus potassium iodide, only 14.3% died.

The scientists hope they can get a grant of funds in order to study the treatment in human patients. They feel pretty sure it will be successful.

Streptomycin treatment alone has not

been too successful in this type of tuberculosis. The iodide acts to release the TB germs from the fibrocascous tissue in which they become entombed in the lungs of patients in late stages of the disease. Once the germs are released, the streptomycin gets a chance to act on them.

Science News Letter, November 13, 1948

PSYCHOLOGY

Drawings Reveal Emotions In Children and Adults

➤ EMOTIONS in both children and older persons may be studied through analysis of their drawings, Dr. L. van der Horst, of Amsterdam, Holland, reported.

The very young child lives in intimate contact with his surrounding world, Dr. van der Horst told the Mooseheart Symposium on 'Feelings' and Emotions in Mooseheart, Ill. It is as much a part of him as is the adult's body. The young child and his picture are one.

Between the age of four and seven, children draw because they need a motor outlet. It is not until somewhere between the seventh and tenth years that it is pos-

sible for the child to think of the object as apart from the self. It is then that the creative urge is revealed and the child begins to have a desire for drawings as symbols to portray his experience.

After the tenth year, the drawings are extended to include human relationships and the child's own imaginings begin to show up. It is even later that the child begins to demand of his drawing that it be an objective reproduction of his intention.

By studying a child's drawings and their linkage to his imaginative life and emotions, we find a new approach to the study of the child mind, Dr. van der Horst concluded.

Science News Letter, November 13, 1948

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Photographs: Cover, U. S. Navy; p. 307, Institute of Inventive Research; p. 309, University of Texas; p. 311, General Electric Co.; p. 314, p. 315, Fremont Davis.

GENETICS

X-Rays Can Harm Genes

If too large a dose of X-rays during routine treatment of a patient reach the reproductive glands, his remote descendants may be born defective.

➤ YOU DO NOT have to wait for an atom-bomb to receive a dose of rays that will cause your remote descendants to be crippled or otherwise defective. It can happen to you in the course of X-ray treatments for certain kinds of cancer, or even in a routine X-ray examination of your abdomen, if enough of the rays reach your reproductive glands.

This warning was given by Prof. H. J. Muller of the University of Indiana, in a lecture before the University of Chicago chapter of the Society of Sigma Xi in Chicago. Prof. Muller received the 1946 award of the Nobel Prize in medicine and physiology for demonstrating the possibility of producing hereditary bodily changes through the use of X-rays.

X-rays and other penetrating radiations used in clinics and laboratories can do the same kind of things to descendants of human beings that they do to the offspring of fruitflies, because the cell mechanisms that determine hereditary characters are essentially similar in them, and in all other higher organisms.

Most mutations are harmful, whether they occur spontaneously or through impact of X-rays or other disturbing influences, Prof. Muller pointed out. In perhaps a majority of cases they are of the type known as lethal, and simply prevent the affected individual from coming into existence at all. But if birth does take place, the unfortunate "mutant" is apt to be deformed, or blind, or abnormal in some other way.

These misfortunes of X-rayed fathers (and mothers) are more likely to be visited on descendants in third and fourth and subsequent generations than on their immediate offspring, Prof. Muller pointed out. Their coming to light depends on the meeting in reproduction of two deficient genes, for if one normal gene is present it will possess the controlling influence, and the deficient gene will simply be carried forward into another generation, to lie in wait for its "opposite number."

X-rays and other rays produce hereditary changes in two ways, Prof. Muller told his audience. The first is the result of an impact on a single gene, changing it from normal to deficient. The second method of change is more easily demonstrated, for it consists in the breaking apart of a whole chromosome by a ray. The broken ends tend to re-unite, but if the patch takes place in the wrong way results in succeeding generations are apt to be unfortunate.

However, X-ray doses are capable of

harming the individual who receives them, even if the usual warning signs such as reddened skin and loss of hair are absent, Prof. Muller warned in conclusion. Recent statistical studies, he declared, have demonstrated that the life-span of persons given courses of X-ray treatments is significantly lowered. For this reason, he suggested strongly the use of alternative treatments, where such exist.

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MEDICINE

Vitamin Lack May Be Cause Of Heart Troubles, Cancer

➤ LACK of some still undiscovered vitamin or other chemical may be the cause of artery hardening, high blood pressure, heart disease and cancer. This possibility was suggested by Dr. Tinsley R. Harrison of Southwestern Medical College, Dallas, at the meeting of the Association of Life Insurance Medical Directors of America in New York.

In the world search for not only longer but more useful and vigorous life, great

strides have been made in conquering two degenerative diseases, diabetes and pernicious anemia, Dr. Harrison pointed out.

Each of these diseases is due to lack of a chemical needed by the body, insulin in the case of diabetes and a substance in liver in the case of pernicious anemia. Other degenerative diseases might, he suggested, also be due to "deficiencies of substances or processes as yet unknown."

Science News Letter, November 13, 1948

ELECTRONICS

Electronic Pencil Enables Composers To Hear Score

➤ COMPOSERS may now play the music they have written on a simple electrical machine by writing out the score with an electronic pencil.

The new composer's music box was described in Cleveland to the Acoustical Society of America by Prof. Robert B. Watson of the University of Texas physics department and defense research laboratory.

"Some composers are able to hear the music mentally at the time of composition," Prof. Watson explained, "but others desire to hear certain musical passages while composing. A composer may now use a compact electro-acoustic device to produce various tones with comparative ease and little distraction from writing his musical score."

The music box is operated similarly to writing with paper and pencil. The tone is started by placing the electronic pencil on



COMPOSER'S MUSIC BOX—Musical scores can now be written with an electronic pencil which permits the composer to hear his music while he is composing it. Pitch and volume are varied by moving the pencil.

the plate of the instrument and stopped by lifting it.

Pitch is increased by moving the pencil upward. Loudness is increased by movement to the right. Tonal qualities of the

sound can be obtained by varying the circuits in the machine. Skull of the player enters in variations of tuning, pitch and volume.

Science News Letter, November 13, 1948

MEDICINE

Polio in Drinking Water

► THE GERMS, or viruses, of infantile paralysis and several other diseases can get into drinking water through back-siphonage in the plumbing system. Once in the water, they can survive for from one to seven days even when the water is chlorinated to the extent most city drinking water is.

Experiments showing this are reported by Dr. Joseph Zichis of the Markham Laboratories in Chicago and Dr. E. A. Piszczek of Cook County Health Department in the journal, *SCIENCE* (Nov. 5). This seems to add evidence to the suspicions of many scientists that one way

infantile paralysis spreads is through contaminated drinking water.

The viruses of St. Louis encephalitis, of western equine encephalitis (so-called horse sleeping sickness) and of lymphocytic choriomeningitis were the ones tested besides the infantile paralysis virus.

Infantile paralysis, St. Louis and Japanese B encephalitis and infectious hepatitis (jaundice) viruses all can produce the diseases when given by mouth, and the infantile paralysis virus is known to leave the body through the intestinal wastes.

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ENGINEERING

Full Use of Highways

► THE PUBLIC is not getting the full use of the highways to which it is entitled, the American Petroleum Institute was told in Chicago by John S. Worley of the University of Michigan. Public interest must come first in the study of any highway problems which may arise.

We are faced with a number of these problems, he said, among them taxation, trade barriers, an adequate highway plant, uniform traffic code, safety, a fuller use of our highway plant, and long-range highway planning. Taxation he characterized as probably our most confusing activity, administered with the least intelligence of all our highway transport activities.

Fuller use of the highways and streets, in which more than \$33,000,000,000 has been invested, includes their use to full capacity. The capacity of a highway is found in the elements of space for and strength for carrying the loads.

The reasonable capacity of a modern rural road, in terms of passenger cars, is about 450 cars per lane per hour when the average speed is 42 miles an hour. Trucks and trailers reduce this amount. Congestion begins where the number of cars increase or the average speed is less. But few rural roads are used to the saturation point.

In urban areas, it is the street intersections rather than lack of lane space which governs the number of vehicles moving along a street. A great deal of the congestion we think we encounter in cities is psychological. If measured in time lost, it would be found to be only a few minutes per 24 hours.

Heavier loads would make possible fewer trucks on the highway, as well as a lower

charge for service, all of which is in the public interest, he declared. Legal loads permitted in adjoining states upon the same road built under Federal specifications show how the public does not get the full use of its highways. On U. S. Highway 23, as an example, the allowable gross load in Michigan is 120,000 pounds; in Ohio, 77,500 pounds; and in Kentucky, only 50,000 pounds.

Science News Letter, November 13, 1948

ARCHAEOLOGY

Prehistoric Eskimo Houses Had Beams of Whale Ribs

► PREHISTORIC Eskimo houses in which the long ribs and jawbones of whales served for timbers were excavated on the coast of Frobisher Bay in Baffin Island during the past summer by Dr. Henry B. Collins, Jr., Smithsonian Institution archaeologist. They were built on the same general plan as the "dugouts" used as dwellings by both Indians and early white settlers in the West, except that in the latter wooden poles supported the roof over the pit that constituted the main part of the house.

Most of the weapon points, tools and household utensils found in the ancient village belonged to the very old but still undated Eskimo type known as the Thule culture. They were made of stone, ivory, bone and antlers. Such artifacts have been found over a wide stretch of territory, from Greenland to Alaska. It is believed that the Thule culture started in Alaska and spread eastward.

Along with these Thule artifacts, which

are large and rough, were many small, very delicately carved implements of the type known as the Dorset culture. Users of these were an earlier people, who also apparently spread eastward from Alaska.

Although it is usually supposed that the Thule culture dates from about 800 years ago, the only definite date that can be assigned in connection with the village which Dr. Collins excavated is one earlier than the end of the sixteenth century, when the English explorer Frobisher penetrated into the waters north of Canada seeking the fabled Northwest Passage. The Eskimos whom he met were already using iron tools—and no trace of iron was found in the ancient village on the shore of the bay that bears his name.

Science News Letter, November 13, 1948

BIOCHEMISTRY

Broken-Down Cells Can Still Synthesize Protein

► A NEW WAY of studying protein synthesis and new information about this all-important tissue-forming mechanism have been reported at the University of California.

Living cells apparently do not have to be intact in order for protein synthesis to be carried on, a team of researchers headed by Dr. David M. Greenberg report.

The scientists broke down the walls of living liver cells, and placed the nuclear material in a nutrient solution. Then they added radioactive glycine, labeled with radioactive carbon 14, which permits the carbon atom to be traced through any chemical reaction.

Radiocarbon atoms showed up in the protein material, indicating apparent incorporation of the glycine into protein. It was also found that a considerable portion of the glycine had been transformed into another kind of amino acid, serine.

Dr. Greenberg said there was evidence that protein synthesis and the transformation of one amino acid into another is accomplished by enzymes, chemical agents which catalyze biochemical reactions. He added that there appears to be a special enzyme for protein synthesis, and another one for transforming one amino acid into another.

The scientists expressed hope that further studies along this line may make it possible to isolate these enzymes. Dr. Greenberg said that while protein synthesis in the laboratory is a long way off, the new information will be of help.

Protein synthesis was observed earlier in the Berkeley laboratories, using radioactive sulfur and radioactive glycine with intact cells in the form of liver slices. However, the new technique expands the scope of experiments that can be performed.

Dr. Greenberg's associates in the research were Drs. Theodore Winnick, Felix Friedberg, and Martin P. Schulman, of the department of biochemistry.

Science News Letter, November 13, 1948

PHYSICS

Mothballs Have New Use

Crystals of the chemical give promise of a new method of detecting radioactivity. In some respects it is superior to the Geiger counter.

► MOTHBALLS promise to become important in giving warnings against dangerous radioactivity from exploding atoms or the detection of new facts about the composition of matter. They are competing with the famous Geiger counter, familiar detecting device of radioactivity.

The stuff of ordinary mothballs is finding a use in the detection and counting of speeding subatomic particles and gamma rays. Naphthalene (mothballs), anthracene, and alkali halides such as sodium iodide have all been successfully tested as detectors, according to recent investigations reported to the *Physical Review* (July 1, Aug. 15), journal of the American Physical Society.

Counters using crystals of these compounds are called scintillation counters, and have characteristics superior in some respects to the familiar Geiger counter.

The scintillation counter is constructed by placing the sensitive crystals in front of the light-sensitive aperture of a conventional photo-multiplier electron tube. A high energy particle or gamma ray in passing through one of the crystals produces a tiny flash or scintillation of light. These flashes are seen by the photomultiplier tube

and are converted to tiny electrical impulses. These tiny impulses are then in turn amplified nearly a million times in the photo-multiplier tube to give a usable output voltage pulse.

The advantage of the new scintillation counter over the more familiar Geiger counter lies in its very high speed of response. The slower Geiger counter has a dead time for a few thousandths of a second after each count before it recovers its sensitivity and is able to detect another particle. The scintillation counter, on the other hand, is so speedy in response that it can make several counts within a millionth of a second.

With the new counter such rapidly occurring events as the decay of a meson or of the energy transitions of a nucleus can be accurately observed and timed in order to supply important new information about the energy spectra of these processes.

Some of the latest reported researches on the new scintillation counters have been done at the University of California Radiation Laboratory, Oak Ridge National Laboratory, and Princeton University.

Science News Letter, November 13, 1948



STREET LIGHTS GET "BRAIN"
—The electronic "brain" which turns street lights on and off automatically at dusk or dawn is in the center transparent tube being demonstrated by a GE engineer.

ENGINEERING

Individual Street Lamps Lighted Automatically

► INDIVIDUAL street lights may now be turned on and off automatically as dusk and dawn approach by means of a small photoelectric cell unit which is designed so that it may be plugged into the top of a properly adapted lamp. The device was revealed by General Electric.

The use of photoelectric cells to turn lights on and off is not new and has been applied for some time with classroom lights in schools and also in other types of buildings. Another application is in the revolving beacon lights placed on aviation routes. This new application, with a specially designed equipment, should result in economy because the individual lamps are in operation only when it is dark enough to need them.

A gas-filled phototube, an electronic device sensitive to red light, is used as the brain of this automatic lamplighter. The type sensitive to red light was selected because the light of the setting sun in early evening is nearer the red end of the spectrum.

A little window in the housing over the photocell unit faces north and so is shielded from the direct rays of the sun. The phototube will operate when outdoor light intensity reaches a point at twilight when objects some 500 feet away become hazy to an observer.

Science News Letter, November 13, 1948

MEDICINE

Boys' Heads Are Bigger

► WORRIED about the size of the baby's head? Does it seem too large or too small?

Usually there is no foundation for such worries, but physicians now have a simple new technique to make sure. A simple chart on head size has just been devised by two University of California Medical School physicians, Drs. Henry K. Silver and William C. Deamer, and published in the *JOURNAL OF PEDIATRICS*.

In most cases what appears to be an abnormally large or small head may be simply a hereditary characteristic. A few measurements over a period of time, using the chart, will determine if the head is growing at a normal rate, in which case there is no need for worry.

However, in a very few cases an abnormally small head may indicate mental retardation or on oversize head may warn of a dangerous increase in cerebral fluid and possible atrophy of the brain.

In these cases "changes in the growth pattern of the head, as compared to normal, may indicate the seriousness of the condition before marked abnormality of shape,

loss of vision, retardation of mental growth or other sequelae have occurred," the physicians write. In many cases serious consequences may be averted.

The physicians point out that in the past it has been difficult for the average physician to take routine measurements of head size, because the data on head size have been buried in lengthy and complex tables, the interpretation of which is difficult and time-consuming.

Their chart is a graphic simplification of these tables, which makes it possible for the practicing physician to compare head size in an infant up to two years with that of the average child.

The chart indicates that boys have larger heads than girls at all ages. At birth the head size for girls ranges from 12.75 to 14 inches, while for boys the range is 13 to 14.25 inches. At two years the normal for girls is 18.25 to 19.5, and for boys, from 18.75 to 20 inches. In all cases 20% of all children will have head circumferences which fall on either side of these sizes without being abnormal.

Science News Letter, November 13, 1948

ENGINEERING

New Diesel Oil Cuts Wear As Much as Nine-Tenths

➤ A NEW lubricating oil capable of reducing wear in diesel engines as much as nine-tenths was revealed in Tulsa, Okla., to the Society of Automotive Engineers by the Shell Oil Company.

It is a compounded heavy-duty type, which not only reduces wear, but promotes engine cleanliness, possesses oxidation stability at high level, and excels conventional heavy-type oils in stability at high piston temperatures.

The lubricant even corrects corrosive wear and fouling, whether caused by operating conditions, sulfurous fuel, or both, the engineers were told by J. A. Edgar, J. M. Plantferber and R. F. Bergstrom, all of the Shell Company, Martinez, Calif. The contents were not revealed.

Science News Letter, November 13, 1948

PHYSIOLOGY

Skin Coloring and Tan Depend on Skin's Chemicals

➤ SKIN COLOR and the skin tan produced under the sun's rays depend a lot on the copper and SH (short for sulfhydryl) in the skin, it appears from research by Drs. Peter Flesch and Stephen Rothman of the University of Chicago.

Formation of melanin, the pigment that gives the dark color to skin, is prevented by SH compounds. The sun's rays apparently eliminate the melanin-checking action of the SH. Copper comes into the situation through a copper-containing enzyme, tyrosinase. The action of this chemical is familiar to anyone who has seen peeled potatoes or mushrooms darken when exposed to the air.

The SH compounds keep balance with the copper-containing enzymes in the resting melanin cells, the scientists suggest. When ultraviolet rays or other agents act on the skin, the balance is upset. The SH groups are put out of action and the copper-containing enzyme can act freely to produce the skin pigment.

Details of the study are reported in the journal, SCIENCE (Nov. 5).

Science News Letter, November 13, 1948

PSYCHOLOGY

Male Declared More Emotional than Female

➤ THE MALE is the more emotional of the two sexes, despite popular opinion. Authority: Dr. John E. Anderson, psychologist of the University of Minnesota, who reported the results of his research on emotions to the Mooseheart Symposium on Feelings and Emotions in Mooseheart, Ill.

The number of emotional situations increases as a person grows older. But just

what you get emotional about changes as you solve life's problems one by one and leave emotion-provoking situations behind you, Dr. Anderson said.

You may not seem as emotional when you are grown as you did as a child or adolescent. But that may be due to the cumulative effect of social pressures to hide and control expression of your feelings.

Men, particularly, Dr. Anderson pointed out, are subject to great social pressure to hide and inhibit emotional expression and so become more "manly."

Emotions are no longer thought of by psychologists as isolated and distinct processes, he explained. Instead, they are changes in the level of energy expenditure related to the mobilizing of your personal resources to meet a new situation. That is why the emotions are constantly changing as an individual meets new situations and they one by one become an old story to him.

Actually no one knows just how much of the apparent complacency and poise of the older person is due to the accumulation of experience which dulls his feeling and how much to the social pressure which makes him play the role of calmness.

Science News Letter, November 13, 1948

ARCHAEOLOGY

Red Sea Level Has Not Changed in 3500 Years

➤ THE RED SEA, whose waters are given Biblical credit for the miraculous overwhelming of Pharaoh's army, has undergone no natural change in level worth speaking of in 3,500 years. This was disclosed before the meeting of the American Philosophical Society in Philadelphia by Prof. William F. Albright of the Johns Hopkins University, who served as archaeologist with the University of California African Expedition.

The party investigated the western shore of the Sinai peninsula, which was the wilderness where the Children of Israel wandered during their long pilgrimage. There they discovered the main point of embarkation for the Egyptian turquoise miners who worked in the region about 1500 B. C. This point was only a few yards above sea level, and soundings proved that it had never been under water for any length of time.

Although the Sinai region is a bleak desert now, Prof. Albright added, it has not always been such a barren wilderness as it was even in the time of Moses. Evidence was found by other parties of the expedition that only a few thousand years before then it had been a good hunting-ground for men of the later Stone Age.

Among the archaeological accomplishments resulting from the expedition has been "the successful decipherment of the so-called proto-Sinaitic alphabet, which is the oldest known form of the ancestral alphabet, to which all existing alphabets go back."

Science News Letter, November 13, 1948



MEDICINE

Cysts Found Responsible In Nerve Root Pain

➤ SCIATICA and other nerve root pain may in some cases be due to cysts on the front of the nerve roots in the spine instead of to a ruptured disk between the vertebrae, Dr. I. M. Tarlov of New York reports in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 6).

The day after the operation at which the cyst was discovered and removed the patient he reports was free for the first time in months from pain in her leg. She left the hospital well and happy on the eleventh day and within two months was able to carry on with her household duties.

In this patient's case the pain, numbness, tingling and disability were at first thought due to pressure on the nerve root of a ruptured disk between the vertebrae. But at operation the disk was found normal. Further examination and cutting away of tissue disclosed the cyst.

Dr. Tarlov urges surgeons to look for cysts in similar cases. He believes the condition is not rare. In the course of autopsy examinations he found such cysts in five of 30 adults, and a Swedish scientist has reported finding eight in 17 autopsies. About 10% of patients thought to have ruptured intervertebral disks turn out not to have them when the surgeon looks for them at operation. Cysts hidden beneath the arch of the sacrum may, he thinks, be the cause of the pain and other symptoms in these cases.

Science News Letter, November 13, 1948

ENGINEERING

Lubrication Simplified In Air Force Planes

➤ SIMPLIFICATION of U. S. Air Force lubrication requirements through standardization of lubricants and lubricating practices has progressed to a point where even the complex and intricate B-50 Superfortress requires only one grease and one oil, the Society of Automotive Engineers was told in Tulsa, Okla., by E. M. Glass, of the Air Material Command, Dayton, Ohio.

Standardization has resulted in reducing to 20 from 400 the number of different lubricants stocked by the 2,300 Air Force installations for maintaining 300,000 planes of 80 different models, he stated. Under the new program, cooperation between design and lubrication engineers is possible, while maintenance engineers are rid of jobs of plane lubrication which have become routine.

Science News Letter, November 13, 1948

E FIELDS

AERONAUTICS

Ram-Jet Engines Tested On F-80 Wing Tips

See Front Cover

► RAM-JET ENGINES mounted on the wing tips of a U. S. Air Force Lockheed F-80 Shooting Star have been undergoing flight tests for nearly a year at Van Nuys, California, and Muroc, California, Air Force Base. The tests have been carried out by Lockheed personnel under the sponsorship of the Air Force.

The ram-jets used in the tests were made by the Marquardt Aircraft Corporation, Venice, California, and are of two types, one seven feet long and 20 inches in diameter, the other 10 feet long and 30 inches in diameter.

A high air speed is necessary to sufficiently compress the intake air for ram-jet engines to operate efficiently, so a "flying test stand" in the form of an F-80 was used. After the F-80 reached the required speed through its standard turbo-jet engine, the ram-jets were ignited. Then the turbo-jet was turned off and the craft was powered by ram-jet alone, as shown on the cover of this week's SCIENCE NEWS LETTER. It is the first man-carrying aircraft to fly under such conditions.

Mechanically simple, ram-jets are merely tubes made of stainless steel, aluminum and magnesium incorporating a grid where a liquid fuel is burned with the compressed air that is produced by the ram effect resulting from the high speed of the plane.

Test flights have been made by the F-80 to determine air and fuel flow, thrust and drag of the ram-jet units. The tests were made to improve and develop the ram-jet engines, not to increase the efficiency of the F-80.

The flying test stand is equipped with automatic observing systems and a motion picture camera to record instrument readings in flight.

Science News Letter, November 13, 1948

CHEMISTRY

New Home Spray Emulsion Aids Dust Allergy Victims

► ASTHMA and other allergy sufferers whose misery comes from house dust can have their homes made more nearly non-allergic by a new product reported in the ANNALS OF ALLERGY (Sept.-Oct.).

The product is called Dust-Seal. It immobilizes allergy-causing house dusts in rugs, carpets and other fabrics, as shown by the disappearance of symptoms in dust-sensitive persons, Dr. Arthur F. Coca of

Pearl River, N. Y., reports.

Some of the germs of colds and other respiratory diseases would also be immobilized since the method is a modification of the floor and fabric oiling found effective during the war in checking the spread of respiratory infection.

Dust-Seal is a water-emulsifiable mineral oil. It comes as a white paste which the housewife mixes with water and sprays on carpets and upholstered furniture, pillows and mattresses. The vacuum cleaner or the garden watering can may be used for the spraying.

The spray is odorless and quickly becomes quite invisible. It is non-volatile and the fabric is not made more than usually inflammable. It is said not to cause "notable injury even to fine Chinese and Turkish rugs."

Dust-Seal is manufactured by L. S. Green Associates of New York.

Science News Letter, November 13, 1948

PUBLIC HEALTH

Air Pollution Problem Confronts Administration

► HERE'S a national health protection job for the new Congress and the next administration: A clean-up of the air in industrial areas, so as to prevent another Donora tragedy in which industrial fumes held by fog killed a score of persons and made many others ill.

The Donora town council requested federal aid. But the federal health service cannot move into such situations as rapidly as might be either expected or helpful because it must wait for a request from State Health Departments. In this instance, election-day closing of state offices at Harrisburg, Pa., delayed by at least a day the aid the federal health service can give.

The danger is over in Donora now that the fog has been dispelled, and the same combination of fog and no wind may not happen again in years. Even if it did, the health danger could be largely prevented if the industry spent a good deal of money to prevent release of dangerous fumes into the air.

Donora is not alone in its air pollution danger. Los Angeles residents go about with inflamed eyes and sore throats much of the time because of air pollution from the industries in and around the city. Other industrial regions face much the same problems.

St. Louis is a notable example of a city that cleaned up its air, with resultant health benefits to its citizens. But while many cities have ordinances for control of air pollution and for smoke abatement, almost no state has any such legislation.

The problem is big enough, in the opinion of Dr. J. G. Townsend, head of the industrial hygiene division of the U. S. Public Health Service, to warrant more attention on the federal level.

Science News Letter, November 13, 1948

ICHTHYOLOGY

Rare Frilled Shark Caught Off Coast of California

► A FRILLED SHARK, one of the rarest of creatures that swim the sea, has been caught off the coast of California by a Santa Barbara fisherman named Pete Metson. Previously caught specimens had been known only from Japan and the west coast of Europe.

The frilled shark gets its name from a series of frilled folds that cover its six gill-slits, which are quite naked in practically all other species of sharks. The fish itself is long and very slender, so that it looks more like an eel than a shark. Mr. Metson's specimen was just under five feet long when caught.

Realizing that he had something unusual, Mr. Metson cleaned his specimen immediately and put it on ice. Later, after his boat had returned to base, he had it frozen. It is now at the California Academy of Sciences in San Francisco.

A careful anatomical study of the shark has been made by Dr. Elmer R. Noble of the University of California's Santa Barbara College. A colleague, Dr. Willard L. McRary, has assayed its liver oil for vitamin A content, which he found very low. They report their results in the journal, SCIENCE (Oct. 8).

Science News Letter, November 13, 1948

ENGINEERING

Oil Deficiencies Result in Over-Consumption in Cars

► EXCESSIVE oil consumption in automobile engines is not always due to mechanical defects in the engine but may derive from physical deficiencies in the oil, the Society of Automotive Engineers was told in Tulsa, Okla., by C. W. Georgi of Quaker State Oil Refining Corporation.

Although other properties may have greater significance from a technical aspect, oil consumption is of great practical value from the popular viewpoint, he said. Oil consumption tends to be the chief yardstick by which many motorists and operators judge oil quality. The investigations made by him on which he reported were with engines in good mechanical condition.

The properties of motor oils which have the greatest effect on consumption tendencies are volatility, viscosity and viscosity index, he stated. Oils having a low volatility within defined limits, high viscosity and high viscosity index tend to possess the lowest consumption characteristics.

Road tests to evaluate oil consumption were made in different vehicles due to the many variables involved. Tests in only a few cars give misleading results. Laboratory engine tests were made also. With proper selection and control of operating conditions, they gave results which correlate well with road tests.

Science News Letter, November 13, 1948

GENERAL SCIENCE

Work of Young Scientists

Science fairs, to which boys and girls from grade schools to high school graduates are entrants, are for some the first step toward recognition as scientists.

By RON ROSS

► HERE ARE some of the things youngsters in your neighborhood may be working on:

Conversion of energy by a talking beam of light.

Six-inch reflecting telescope.

Space ship to Mars.

Manufacture of sulfuric acid.

Liquefaction of gases.

Home-made microscope.

These were some of the entries in a Science Fair held last spring in St. Louis. Projects such as these are now being developed by youngsters who will make entries in science fairs in communities all over the nation during the coming school year.

Entrants in science fairs are boys and girls from the grade schools to high school graduates. These young scientists put their projects on display at the fairs held in schools and community centers in their home towns.

New Departure

They are a new departure from the traditional county and state fairs. The girls who once might have entered jams or needlework in a county fair now may present an explanation of some nuclear phenomenon, a demonstration of making plastics or a dissected biology specimen.

Boys who might have entered the more traditional fair with a carefully groomed calf, can now be found explaining the theory of engines, building telescopes or illustrating the laws of chemistry.

Science fairs are generally held in the spring, with the cooperation of schools, newspapers and other institutions in the community. In a large auditorium, the youngsters set up the exhibits of their work. Months and even years of study, collecting and experimenting sometimes go into these exhibits.

Judges award prizes for the best work in the different classifications, while proud parents and other friends tour the exhibits. But the youngsters generally spend most of their time during the fair discussing their work and the other exhibits with their young fellow scientists.

For some of the entrants, the science fair is the first step toward recognition as a scientist, perhaps aided along the way by a scholarship award for a prize project. Others are encouraged toward a satisfying hobby. Some, who have ambitions in sci-

ence, discover they have greater aptitude in other fields.

Rock collections, model airplanes and such familiar hobbies of young people form only a part of the entries at the fair. A well-informed adult will be startled to discover the scientific achievement of many high school students who enter science fairs.

Still new compared with the more traditional fair, science fairs first began more than two decades ago with those held by the American Institute of the City of New York. These have continued while many other cities and communities have taken up the idea.

Supporting the development of the science fairs is an organization of a third of a million young scientists, Science Clubs of America. These young scientists are members of the 15,000 science clubs in this country and abroad. From this group of science-minded young people in junior and senior high schools come many of the entrants and winners in the science fairs.

There are such clubs in your locality. Science Service is cooperating with school officials and scientists throughout the nation in providing the information and know-how for science club organization and activities. Any teacher or interested adult who sponsors a science club can, without any cost whatever, affiliate it with the national Science Clubs of America and receive a hundred-page handbook full of data and aids to science hobby activities.

The young science enthusiasts have fun in carrying out their science projects. But what they do is very far from mere child's play.

Organizations Cooperate

Leading science organizations, in government, industry and elsewhere, cooperate in suggested projects. Many of the investigative tasks are of direct, practical benefit to the communities in which the science club members live.

The professional scientists and teachers also do their bit to help this youth movement in science. State science academies, universities, colleges, teacher associations, museums and other organizations are co-operating.

Each year Science Clubs of America conducts the national Science Talent Search which culminates in the award of the Westinghouse Science Scholarships at the Science Talent Institute at Washington. This is a crowning activity of the science clubs and in many cases the seniors who participate

have been working on their science hobbies during the whole six years of their junior and senior high school work.

Girls as well as boys are members of the science clubs; most of the activities can be carried on as effectively by girls as by boys. In the Science Talent Search each year the proportion of girls who win honors is determined by the ratio of girls to boys who enter.

The science club activities of high school students have won approval from national and science leaders as a serious and important aid to the nation's science program.

Need of Scientists

America finished the war with a realization that there were not nearly enough scientists and development engineers available to discover new basic knowledge, do the necessary industrial and military research and train the oncoming scientific generation.

Many of the science club members in the schools of the nation this fall are receiving their first contact with science and its possibilities. The extent to which they and their teachers develop science club opportunities will determine to a large degree how well the urgent national need for scientists will be answered in the future.

For every club member who will become a professional scientist there are hundreds who will not. For most of the school science hobbyists, science will remain a hobby throughout life, whether they become lawyers, merchants, housewives or follow some



SCIENTIST IN THE MAKING—
This junior high miss dissects an insect as part of her Science Clubs of America activity.



FOLLOWING IN DAD'S FOOTSTEPS—Paul Condon and his brother Joe, sons of Dr. Edward U. Condon, director of the National Bureau of Standards, display their projects at a Washington, D. C., Science Fair.

other pursuit outside science. For these non-professional scientists of tomorrow, the serious fun they have in science clubs is one of the richest experiences of their youth. They will be better equipped to live in a scientific world and control the results of science so that civilization will progress rather than be wiped out.

Science fairs are fun for young scientists who enter—and for their parents and friends and the adult sponsors of the fairs—but they are also an important event in

building intelligent leaders of the future.

Anyone interested in science clubs can get information by writing to Science Service, 1719 N St., N. W., Washington 6, D. C.

Science News Letter, November 13, 1948

MEDICINE

Outbreak of Rash Among Sailors Traced to Moths

➤ A SKIN ERUPTION which attacked about two-thirds of an American merchant marine crew which entered a Venezuelan port was traced to a tropical moth. Three Boston physicians suggest that in any outbreak of rash the moth should be suspected, especially in crew members of ships or airplanes which enter South American ports.

On the first night the American crew anchored in port, a swarm of moths invaded the ship. The sailors killed them by crushing them between their fingers. Shortly afterwards some of the men noticed "small white itching bumps" on their skins and on the following morning their bodies were covered with a rash except for the face, palms and soles of the feet.

Other crew members noted the eruption on arising in the morning. This was traced to the bed linen which had been changed the night before. The closet in which fresh sheets were stored was made of meshed metal which permitted the entrance of the moths, several of which were found on the closet floor and some suffocated between the stacked sheets.

Twenty-nine of the 31 sailors who got the rash were treated at the United States

Marine Hospital in Brighton, Mass., by Drs. William R. Hill, A. Daniel Rubenstein, and Joseph Kovacs, Jr., who present their report in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 6).

The eruption developed from a few minutes to a few hours after contact with the moth or with moth-stained bed sheets, the physicians state. Removal of the patient from the source of contact, a soap and water bath, a change to clean clothing and application of an alkaline wash usually brought relief. The patients became well in four to seven days.

The moth has been identified as the female of the genus *Hylesia* by V. Nabokov of the Museum of Comparative Zoology, Harvard University. These moths belong to the family Saturniidae, sometimes called, in English, peacock or silk moths, according to the report. They are attracted by light which explains their being on board ship, as the vessel had powerful lights.

Science News Letter, November 13, 1948

PLANT PHYSIOLOGY

Radioactive Molybdenum Shows Need of It in Plants

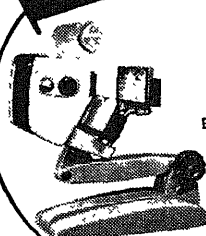
➤ MOLYBDENUM, the steel-maker's "seasoning," is also needed in extremely small amounts by plants—as little as ten parts per billion by fresh weight. To trace these minute quantities into and through plants, Drs. P. R. Stout and W. R. Meagher, University of California plant physiologists, have made use of radioactive molybdenum isotopes, supplied to plants that had been deprived of even the slightest speck of the element.

Molybdenum-starved plants show two outstanding symptoms: they lose the green color in their leaves, and they become unable to make use of nitrates taken up by their roots, piling these necessary salts up in their leaves to as much as 12 times normal concentration.

When molybdenum is supplied in even very low concentration these conditions are corrected in a matter of hours. The healthy green color re-develops in the leaves, and the abnormal concentration of nitrates is reduced to a more usual level.

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Do You Know?

Tea and butter *rationing* will continue through 1949 in Australia.

Among the most pugnacious of the carnivorous insects is the *tiger beetle*, which feeds exclusively on other animals.

Decorative *evergreens*, around the house, are often damaged by snow breakage during the winter; this can be largely prevented by winding them with a soft cord to bind the tops together.

Wafers with a cheese-like flavor and the texture of potato chips contain one-third skim-milk solids and two-thirds potato solids; boiled potato and skim-milk are thoroughly mixed and seasoned, then spread thin, dried and toasted.

Sponge iron, so called from its spongy character, is metallic iron extracted from ore without bringing it to the melting point; by using coal, char, or gas as a reducing agent, oxygen is taken from the ore at temperatures below the melting point of iron oxide.

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traced in plants by placing them on photographic film and letting the radioactivity register itself in the sensitive emulsion, it was found that the element becomes concentrated almost entirely in the leaves, especially in the spaces between the veins. Very little of it remains in the stems, or even in the leaf-veins.

In another series of experiments in the same laboratory, Dr. Richard B. Walker, now of the University of Washington, studied the effects of supplemental supplies of molybdenum on plants growing in molybdenum-deficient soils. Here again, the plants grew pale and sickly-looking, and were restored to normal by the treatment. It was even possible to give them their restorative doses of molybdenum by painting a solution containing it on their leaves.

Results of both these research projects are presented in the journal, *SCIENCE* (Oct. 29).

Science News Letter, November 13, 1948

MEDICINE

Tantalum Foil Tubes for Nerve Surgery Patented

➤ TUBES of thin tantalum metal foil, for use in nerve surgery, have been patented by Dr. Paul A. Weiss, the University of Chicago neurologist who devised the method. Rights in U. S. patent 2,451,703, just granted, are assigned to the government.

Tantalum, a grayish-white metal little known until recently, has become a preferred material in many surgical uses because it does not corrode in the presence of any of the body fluids and has no irritating action on the tissues. For nerve surgery it must be used exceedingly thin; five thousandths of an inch has been found the best thickness. It must also be heat-treated to increase its resilience.

To make his nerve-mending tubes, Dr. Weiss wraps a piece of tantalum foil around a quartz tube of the desired diameter, binding it on with fine steel wire. He runs a steel rod through the quartz tube, for heat-conducting purposes, and puts the whole into an electric furnace for a minute or so at 800 degrees Centigrade. After cooling, the tube is stripped off and trimmed ready for use.

Dr. Weiss has also used nylon and short pieces of artery in his nerve-mending procedure. These materials, however, are not considered in the present patent.

Science News Letter, November 13, 1948

ORNITHOLOGY

If Pheasant Is Purple, You Aren't Seeing Things

➤ IF A PHEASANT with purple, green or blue feathers crosses your path, you may not be "seeing things." The bird will be real—and the rainbow feather-colors will be real, too.

Outdoor scientists sometimes dye birds' feathers with hues not found in nature as

a means of quick identification at a distance. This enables them to keep track of their movements and learn the extent of their range.

Newest techniques and dyes useful in this particular branch of applied ornithology were described in the *JOURNAL OF WILDLIFE MANAGEMENT* (October) by Dr. L. A. Wadkins of Washington State College. He has made use of 14 different dyes in a variety of solvents. Best results, on the whole, were obtained with 33% alcohol.

Science News Letter, November 13, 1948

AGRICULTURE

More Sunshine Puts More Sugar in Apples

➤ APPLES have more sugar if they get more sunshine during the growing season. This was learned at Cornell's Agricultural Experiment Station, Ithaca, N. Y., in a long-time study aimed at correlating some of the factors like rainfall, amount of sunshine, and temperatures to the keeping quality of apples.

Another discovery was that the higher the temperatures during the last six weeks before harvest, the greater has been the amount of scald in storage. The scientists will test this information further during the 1948-49 storage season, based on predictions made the last six weeks before harvest. Such knowledge, they say, will be of value to growers, who could move scald-susceptible varieties out of storage rapidly if considerable scald were expected.

Science News Letter, November 13, 1948

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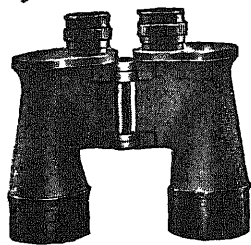


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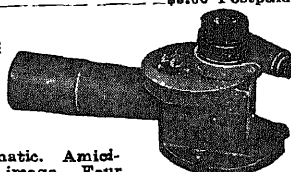
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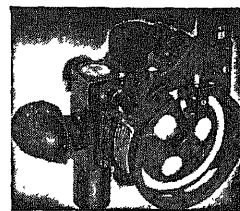
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RADIO

Ionized Clouds at Night

➤ CLOUDS of ionized atmosphere, invisible to the human eye, are all that remain at night of the "radio roof" that during the day enables us to hear distant broadcasts.

These clouds are about 55 to 65 miles above the earth's surface, R. A. Helliwell of Stanford University reported at the joint meeting of the International Scientific Radio Union, American Section, and Institute of Radio Engineers in Washington.

Whereas the highest radio-reflecting layers, extending from around 100 to 250 miles above the earth, are always present, the lower layers come in with sunlight. The electrons, knocked out of atoms by the sun's ultraviolet light, tend to recombine when sunlight is withdrawn.

These patchy clouds of ionization are

probably blown about by the high-velocity winds known to exist at ionospheric heights, Mr. Helliwell stated. At times the lowest of these clouds of ions remain substantially stable for as long as ten minutes, again within a few minutes they will be five miles lower or higher than before.

The ionized layers are assumed to be quite patchy in the lower fringe of the ionosphere. Echoes from radio signals, sent directly upward from a broadcasting station, are sometimes received from two clouds, one six to ten miles above the other. While some signals are reflected from low-level clouds of ionization, some penetrate between these patches and are reflected from clouds at a higher level.

Science News Letter, November 13, 1948

CHEMISTRY

Quartz Crystals Made

➤ SYNTHETIC quartz crystals, suitable for use in radio equipment, have now been produced in high-grade quality under the sponsorship of the Army Signal Corps.

During the month of September, the Brush Development Company of Cleveland delivered to the Signal Corps the largest synthetic quartz crystal, essentially free from defects, known to have been produced from any artificial source. The greatest dimensions of the sample are equal to the diameter of a silver dollar.

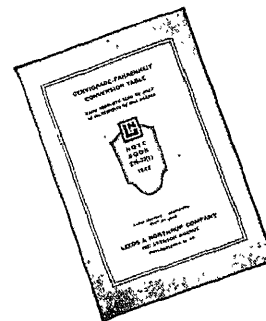
Quartz crystals are grown by deposition from a solution containing the raw material derived from quartz-sand or other silica materials, in a closed metallic container at a temperature of about 750 degrees Fahrenheit and at pressures as high as several thousand times that of the atmosphere. Individual molecules are deposited on a seed crystal in a regular manner to produce a larger model with the same shape as the seed.

It is believed that mass production of synthetic quartz crystals may be feasible, but considerable laboratory work must be done before they can be made economically. Their manufacture in this country would make the nation independent of natural quartz crystals which now come principally from Brazil. Relatively little satisfactory quartz for the purpose has ever been found in the United States.

The quartz crystals are used in radio transmitters, and in other applications, to regulate radio oscillation or radio wave frequency. A quartz crystal is what scientists call a piezoelectrical substance. It forms electrical charges on its surface when mechanically stressed, or exhibits mechanical strains when electrically charged. Other substances have the same properties, but

none have been found that are as satisfactory in use or as economical as quartz.

Science News Letter, November 13, 1948



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A. S. T. M. STANDARDS ON TEXTILE MATERIALS (WITH RELATED INFORMATION)—A. S. T. M. Committee D-13—*American Society for Testing Materials*, 547 p., illus., paper, \$4.35. Specifications, tolerances, methods of testing, and definitions and terms. The photomicrographs are interesting.

AMERICAN HIGH SCHOOL BIOLOGY—Charlotte L. Grant, H. Keith Cady and Nathan A. Neal—*Harper*, 888 p., illus., \$3.28. Contributing in an important measure to the value of this text are the beautiful photographs with which it is illustrated.

ANT HILL ODYSSEY—William M. Mann—*Little, Brown*, 338 p., illus., \$3.50. Whether you are interested in insects or in the adventures of a delightful person you will want to read this autobiography of the director of the National Zoological Park.

BACTERIAL AND MYCOTIC INFECTIONS OF MAN—Rene J. Dubos—*Lippincott*, 785 p., illus., \$5.00. A text from the Rockefeller Institute for Medical Research aided by a grant from

the National Foundation for Infantile Paralysis. Planned to meet the need for texts which interpret current research and to recognize the trend toward the increasing amount of study time devoted to the subjects.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING, CASE STUDIES 2: The Libbey-Owens-Ford Glass Company and the Federation of Glass, Ceramic and Silica Sand Workers of America—Frederick H. Harbison and King Carr—*National Planning Association*, 61 p., paper, \$1.00.

CORAL—Roland S. Young—*Reinhold*, 181 p., illus., \$5.00. A monograph dealing with the chemistry and metallurgy of coral and also its biological importance.

A CONCISE HISTORY OF MATHEMATICS—Dirk J. Struik—*Dover*, 299 p., 2 vol., illus., \$3.00. A readable account beginning with prehistoric times.

CRIME AND THE MIND: An Outline of Psychiatric Criminology—Walter Bromberg—*Lippincott*, 219 p., \$4.50. Based on the clinical study of hundreds of convicted criminals and written by the senior psychiatrist at Bellevue Hospital.

FOOD PRODUCTS—Henry C. Sherman—*Macmillan*, 4th ed., 428 p., illus., \$4.80. A textbook on nutrition.

GERMICIDES, ANTISEPTICS AND DISINFECTANTS FOR HOSPITAL USE—Dewey H. Palmer—*Hospital Bureau of Standards and Supplies*, 15 p., paper, \$1.00. Technical information.

HALLMARKS OF MANKIND—Frederic Wood Jones—*Williams and Wilkins*, 86 p., illus., \$2.50. The British author holds that man is more primitive in structure than living apes but has his own structural specializations that distinguish him from other mammals.

LIVES OF MASTER SURGEONS—Richard A. Leonardo—*Froben*, 469 p., illus., \$6.00. Brief biographies, alphabetically arranged.

MICROBES MILITANT, A CHALLENGE TO MAN: The Story of Modern Preventive Medicine and Control of Infectious Diseases—Frederick Ebersole—*Ronald*, rev. ed., 401 p., illus., \$4.50. Technical subject matter written in such a way as to be of interest to the general reader.

PAPERS PRESENTED AT THE NAVAL ORDNANCE LABORATORY MAGNETIC MATERIALS SYMPOSIUM—U. S. Naval Ordnance Laboratory, 61 p., illus., paper, \$8.75, microfilm, \$3.00. Price correction.

PREHISTORIC MEN—Robert J. Braidwood—*Chicago Natural History Museum*, 117 p., illus., paper, 50 cents. A simply written book about our earliest ancestors and what is known of them.

THE SHAME OF THE STATES—Albert Deutsch—*Harcourt, Brace*, 188 p., illus., \$3.00. A graphic description of the deplorable conditions found in state mental hospitals dramatically emphasized by documentary photographs.

STUDIES IN ANALYTICAL PSYCHOLOGY—Gerhard Adler—*Norton*, 250 p., illus., \$4.00. Conclusions from 15 years of practice by a British analytical psychologist including an exposition of Jung's contribution.

TEACHING ELEMENTARY SCIENCE: Suggestions for Classroom Teachers—Glenn O. Blough and Paul E. Blackwood—*Gout, Printing Office*, 40 p., illus., paper, 15 cents. It is not necessary to have a lot of expensive equipment in order to let children begin to find out by experiment. Here are helpful ideas to start you off.

TECHNIC OF MEDICATION—Austin Smith—*Lippincott*, 255 p., illus., \$4.00. For medical student and general practitioner.

TO MAKE THE PEOPLE STRONG—A. Edward Stuntz—*Macmillan*, 298 p., \$3.50. On how the peoples of the Americas are making life better through cooperation on public health, increasing food yields, education and other similar fields.

WOMAN'S MEDICAL PROBLEMS—Maxine Davis—*McGraw-Hill*, 2d ed., 242 p., \$3.00. Helpful information consisting in large part of articles that originally appeared in *Good Housekeeping*.

A STUDY OF FISH—Chapman Pincher—*Duell*, 343 p., illus., \$4.00. Information of interest to the fisherman and general reader. Illustrated with drawings by the author.

Science News Letter, November 13, 1948

A fine legal line between noise and free speech may have to be defined in New York because of a new ordinance regulating the use of *sound trucks*.

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Science News Letter, November 13, 1948

⚙️ **NUT-SHELLER** clips small portions of the shell away instead of cracking the entire shell as done by ordinary nut openers. It is a handtool of plier-like construction with cutting teeth of special steel sharpened to a very fine edge.

Science News Letter, November 13, 1948

⚙️ **REFLECTIVE SHEETING** for automobiles permits the shape and color of the vehicle to be plainly visible at night under the headlights of approaching cars. The sheeting is made with a smooth, glossy surface that does not change the daytime appearance of the car. It comes with a solvent-activated adhesive which grips on contact.

Science News Letter, November 13, 1948

⚙️ **WIRELESS HEARING aid**, shown in the picture, is carried in the pocket or handbag, and held to the ear only when wanted. It is a sound amplifier, complete with



microphone, receiver, batteries, midget vacuum tubes, transformer and volume control. It is designed for persons with slight hearing losses.

Science News Letter, November 13, 1948

⚙️ **SHAVING BRUSH**, whose handle is a

receptacle to hold the shaving cream, is supplied with the lathering material in the quantity desired by the turn of a knob on the outer end of the handle. The cream passes through the wet brush, becoming a lather ready for the beard. A cap covers the brush when not in use.

Science News Letter, November 13, 1948

⚙️ **SNAP-ON VISORS**, for use on automobile windshields, are made of highly polished aluminum and equipped with thin stainless steel plates which slip under the rubber seal and frame. The two sections are held rigid by the use of a tie-bolt connecting them over the center windshield bar.

Science News Letter, November 13, 1948

⚙️ **ICE GRIPPERS**, an improved type to fit over the shoe, can be slipped on or off in a jiffy and can be carried in a vest pocket. They are hardened rust-proof steel elastic web bands, and a heavy-duty type has half-inch teeth.

Science News Letter, November 13, 1948

⚙️ **BOWLING BAG**, to hold the favorite bowling ball, is made of leather but its base is a molded plastic with an inside built-in retainer cup in which the ball rests. The plastic base is attached to the leather sides with two rows of machine stitching.

Science News Letter, November 13, 1948

• Nature Ramblings by Frank Thone •

➤ **NEXT SPRING'S** Easter bonnets and dainty gowns are already being made, and shortly after Christmas they will be moving onto the merchants' shelves. But even the fabricators of fashions are not more forehanded than the herbs and shrubs and trees of the woodlands. Practically every flower and leaf that will gladden our eyes next April and May is already in place, and only awaits the signal that will be given by the returning sun and the warm spring rains.

Preparation for next spring's flowers, as a matter of fact, began immediately after last spring's flowers had faded, and in most plants went on even while fruits and seeds were ripening. The leaves of plants like dog-tooth violet and trillium, that stood all summer long with no flowers to grace them, were busy all the time making food and sending it down into underground bulbs, corms and rhizomes. In the meantime, buried growth-points were forming up into the beginnings of buds, enfolding the embryonic structures of another crop of

Ready for Spring



flowers. When the new growing season comes on, the food reserves will be liquidated and poured into the task of speeding the unfolding of the new flowers.

Something of the same sort goes on all over the branches of woody plants that blossom early in spring, like dogwood and redbud, and the lilacs and forsythias of our gardens. In the axils of this year's leaves, or

at the twig-tips, the buds of next year's growth form during the summer. Already in them are the beginnings of next spring's bloom.

Only by provisions like this can we have spring flowers at all. Flowers are expensive things: they need a great deal of food for their structure, and more for the energy expended in the rapid process of blossoming. Most plants have to make their own food, which is the job of mature leaves. If flowers come before the leaves, or while the leaves are young and small, the food will have to be stored ahead of time.

The whole process of forcing flowers, so that we have a foretaste of spring even in winter, is based on this fact. We bring bulbs or cut branches indoors, giving them as nearly spring-like conditions of temperature, moisture and light as we can provide. These stimuli cause the unlocking of the natural food cupboards, and release the chain of events that ends in the early unfolding of the flowers.

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

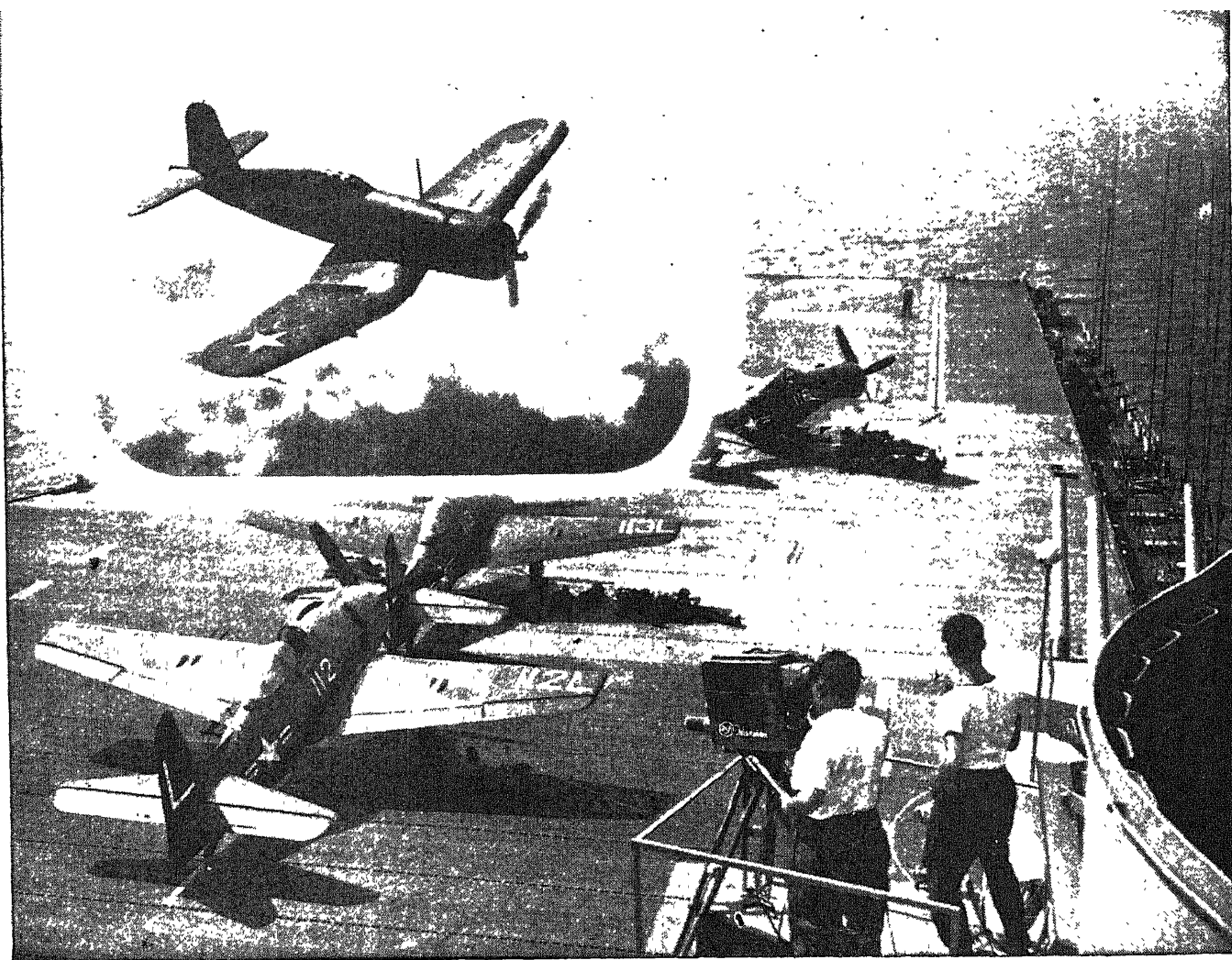
Bright Comet

See Page 323

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Making television history, first coverage of air-sea maneuvers demonstrates value of research by RCA Laboratories to our armed forces.

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MEDICINE

New Vitamin Discovered

Experiments with mice indicate that it increases the body's resistance to infection. This protective quality is believed to apply to man also.

► DISCOVERY of a new vitamin in wheat which increases natural resistance to infection, or germ-caused disease, was announced by Dr. Howard A. Schneider of the Rockefeller Institute for Medical Research, New York, at the meeting of the American Public Health Association in Boston.

Existence of this vitamin and its proved relation to disease resistance in mice goes far toward establishing the idea that being well nourished is a protection against germ-caused diseases. Well nourished takes on a special meaning in this connection, that of eating regularly a diet including the new vitamin.

The evidence so far is only for mice and their resistance to a naturally occurring disease of these animals, mouse typhoid, or Salmonellosis as scientists term it. But Dr. Schneider thinks it likely that what is true for mice will also in this case prove true for man.

The vitamin is believed to be a new one since tests showed none of the other known

vitamins or other nutrients can replace it in the mouse diet with the same effect on disease resistance.

It occurs generally throughout the cereals and grasses as well as in wheat germ. Alfalfa contains it. Rockefeller scientists are now trying to isolate and identify it chemically.

The vitamin was discovered in an eight-year study of factors influencing the spread of infection among herds of mice. All kinds of diets of natural and synthetic foodstuffs were used, as well as virulent and non-virulent strains of the disease germs and mice of various hereditary strains.

Among mouse populations of mixed heredity, such as human populations have, the new vitamin increased resistance to mouse typhoid. But among inbred mouse populations with unmixed heredity, it did not matter what diet the mice ate. Their resistance to disease and the issue of their living or dying was found to be solely a matter of heredity.

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SMOKE DETECTOR—Highly sensitive to smoke, one puff from the cigarette sets into operation the electrically-controlled smoke exhaust system.

ENGINEERING

Smoke Control System Cuts Panic Danger During Fire

► A COMBINATION electric-eye smoke detector and automatic exhaust system is designed to lessen danger from panics, or from toxic gases, in public buildings. This installation is in a department store.

The technique employed uses a Walter Kidde and Company smoke detector and a Westinghouse exhaust apparatus. The system for combatting smoke was installed in the Sage-Allen store, Hartford, Conn., to supplement the store's existing sprinkler equipment. Smoke spreads faster than fire and therefore is a bigger threat to a completely sprinklered building. Superheated, air and toxic gases from a fire passing to floors above may cause loss of life, and smoke may cause a panic.

Each floor of the building has an independent detection unit. Through six tiny inlets on each floor, continuous samples of air are drawn by a small fan in the basement. The electric eye, a photoelectric cell, in each unit will note even a slight amount of smoke present. It automatically activates the exhaust system, starting the exhaust fan, opens the collection duct damper on the floor where smoke is detected, closes all other floor dampers, and opens the fresh air intake.

To provide a controlled path for smoke removal, the system utilizes collection ducts surrounding the stair wells on the various floors. These ducts lead to an exhaust fan on the roof which can suck out 32,000 cubic feet of air a minute.

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ASTRONOMY

Spot Bright New Comet

See Front Cover

► A BRIGHT new comet with enormous trailing tail was spotted Nov. 6 in the early morning sky. One of the brightest comets of our generation, it could be seen with the unaided eye an hour or so before sunrise low in the southeast.

Picked up in the constellation of Virgo, the virgin, the comet was far enough north to be seen, at least faintly, by most people in the United States. It was photographed with the 18-inch Schmidt camera at Palomar Observatory, Calif., and is shown on the cover of this week's SCIENCE NEWS LETTER. Henry L. Giclas of Lowell Observatory, Flagstaff, Ariz., and Dr. Dinsmore Alter, director of Griffith Observatory in Los Angeles, were among the first (Nov. 9) in this country to see the comet.

With a second magnitude nucleus, the comet was as bright as the stars forming the Big Dipper. It was thus brighter than Halley's comet in 1910, its most recent visit to the vicinity of the earth. Its tail was reported by some to extend 15 degrees across the sky, by others to cover 20 degrees. This means it was 30 to 40 times the diameter of the full moon.

The comet will undoubtedly go down in history as comet 1948 1, because not one man, but a large number of people discov-

ered it independently. Its closeness to the sun prevented an earlier discovery of this brilliant object. The letter "1" denotes it is the 12th comet spotted this year.

First report of the comet to reach the United States was from Dr. J. S. Paraskevopoulos, superintendent of Harvard's South African station at Bloemfontein. He said the comet was spotted Nov. 7 ten degrees south of the bright star Spica.

A subsequent report from Australia showed the comet was discovered there on Nov. 6.

The comet was also found independently by Luis Rivera and Lauro Herrera, according to a later telegram from Director Luis Enrique Erro of the National Astrophysical Observatory, Tonanzintla, Mexico. It was also spotted by the Second Officer of the steamer Mendoza in the North Atlantic ocean.

Most enthusiastic reports from astronomers and amateurs in the United States reaching Harvard College Observatory, astronomical clearing house for the Western Hemisphere, were from those in the southern part of the country. There the comet could be picked up earlier in the morning than in the far north and thus seen with greater brilliance.

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TECHNOLOGY

Allies Reach Agreement

► THREE great nations, the United States, Canada and Britain, allies in two world wars and ready to stand together if another emergency arises, will have taken an important strategic and commercial step when their agreement to standardize threads of screws, nuts and bolts is signed this month.

The agreement has already been made. Representatives of the three nations met in Washington this month at the National Bureau of Standards to formalize it. When signed by them, it goes into immediate effect. One of the largest automobile manufacturers is reported ready to make the necessary changes the day of the signatures.

To many the standardization of screw threads may seem a minor matter. Without it, however, a British nut will not fit on an American bolt. With it an American driver of a British Austin car who loses a nut will not have to wait for a replacement from England. The same holds true for all types of machines built in one country and used in another. Standardization of screws, nuts and bolts is particularly important in aviation.

Important as the standardization is in peacetime, it is more important in war, particularly among nations who are fighting side by side. During the recent war millions of tons of precious steel went into bolts, nuts and screws, and great quantities were sent abroad to wherever American equipment was in use so that these war essentials could be kept in usable condition.

In America, the standard screw thread of today is made at an angle of 60 degrees, with a cross-section looking like the sharp teeth of a saw. In Britain, the thread has flat sides at an angle of 55 degrees to each other and with rounded tops and bottoms. The new agreement will establish several classes of screw threads with compromise

dimensions which will enable the essential surfaces of corresponding classes to fit exactly.

This standardization step, which marks a definite turning point of the machine age, is the result of negotiations over the past 30 years or so which came to a real head during the war because of the wide use of American equipment by all the allies. The United States government took a very active part, but much of the success in reaching a conclusion is due to technical societies, particularly the Society of Automotive Engineers, the Society of Mechanical Engineers, and the American Standards Association.

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ENTOMOLOGY

Ship Insects From China's Redwoods to California

► FIRST SHIPMENTS of a collection of 60,000 insects from the Dawn Redwoods forest of China have been received at the California Academy of Sciences in San Francisco, Director Robert C. Miller announced. An entomological expedition headed by Dr. J. Linsley Gressitt and sponsored jointly by the Academy and Lingnan University, of Canton, is now at work among the Chinese redwoods, recently discovered alive after having been known only as a fossil species.

The collection will be studied with especial care to find what relationships, if any, can be found between the insects that live among the Chinese redwoods and those of the redwood forest of the California coast. Any such possible kinships or resemblances among the insects will be significant in working out the lines of descent of the existing redwoods from the redwoods of

50,000,000 years ago, whose vast forests circled the whole Northern Hemisphere.

It has already been learned that *Metasequoia*, the Chinese redwood, is limited to one valley, named Shui-Hsa-pa, in Hupeh province. About a thousand trees have thus far been counted. Along with them grow oaks, beeches, birch, linden and rhododendron, giving the forest a strong resemblance to woodland areas in the eastern United States.

Part of the insect collections will be retained by the Academy; the rest will be returned to Lingnan University.

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PHYSICS

Atom Scientist Nobelist

Outstanding British physicist is honored for his research on cosmic radiation. His formulation connecting magnetism and gravitation was an important contribution.

➤ "FOR the discovery of a connection between magnetism and gravitation."

That might well be the citation of the 1948 Nobel Prize for physics awarded to Prof. P. M. S. Blackett, of Manchester University, one of Britain's outstanding physicists. Actually the award is reported to be "for discoveries in the field of cosmic radiation."

Last year Prof. Blackett presented to the Royal Society of London a mathematical relationship between electromagnetism and gravitation that arises out of the rotation of such massive bodies as the sun, earth and stars.

This formulation was hailed as possibly as significant as the Einstein relationship between mass and energy which was given such powerful reality by the atomic bomb. Like $E = mc^2$, the Blackett formula has a cryptic appearance. In it there are: P , the strength of the magnetic field; β , a constant near unity; G , the gravitational constant; c , the speed of light; and U , the angular momentum or spin of a revolving body.

In some laboratory at the present time an experimental test of this relationship may be under way, since Prof. Blackett proposed an experimental test. It would consist of revolving a large sphere quite rapidly and measuring its magnetic field.

Whether or not the Blackett formulation proves to be the basic connection between magnetism and gravitation, the earlier re-

searches recognized by the Nobel award made important contributions to the understanding of the constitution of matter and radiation.

Prof. Blackett was one of the famous Cavendish Laboratory team of physicists that was led by the famous Rutherford. At Cambridge Prof. Blackett studied cosmic rays and found positive electrons (positrons) as well as ordinary electrons bursting out of cosmic ray showers. He was in the group that made positrons artificially. He estimated that the short-lived positrons were so plentiful that they must account for a thousandth part of the whole material universe. This was as early as 1933.

During the second world war, Prof. Blackett gave up tracking cosmic rays and atomic particles to work on Britain's early radar defense system and track Nazi planes instead. But he is back at his research now, famous and fifty, puzzling out more deep secrets of the universe.

Not all his time is spent on research, however. He is an "atom scientist," adviser to the British government on atomic energy. His book titled *MILITARY AND POLITICAL CONSEQUENCES OF ATOMIC ENERGY*, published in mid-October, says that Russia would be foolish to accept the proposals of the United States for the control of atomic energy. In his view, the dropping of the atomic bombs on Japan was actually the first act of the cold diplomatic war with Russia now in progress.

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of different weights by whirling them in the centrifuge. But sometimes the centrifuge method of separation can not be used.

Prof. Tiselius made an apparatus that takes advantage of the different electrical charges which protein particles possess to effect the separation. By placing a solution of such particles between electrodes and applying electrical voltage, it is possible to obtain a migration of the particles. Those with the greatest charge move the faster.

The trick of the Tiselius apparatus is to produce a current in the solution flowing against the motion of the particles. Usually the current flows just as fast, in one direction, as the slower of the migrating particles is moving in the other. These particles, therefore, are like a man on a treadmill who, though he walks swiftly, never really does anything but stay in one place.

Meanwhile the particles with the greater electrical charge are moving just a bit faster than the opposing current so that eventually they reach one end of the chamber and the separation has been effected. The Tiselius method has been used in several laboratories in the United States, particularly in connection with study of living tissues.

The method of adsorption analysis cited in the Nobel award makes it possible to separate and differentiate between proteins, acids, sugars, salts and other substances that

CHEMISTRY

Swedish Chemist Nobelist

The winner of this year's prize gained his award for developing two methods of analysis that may lead to new advances in the field of biology.

➤ NEW ADVANCES in treating disease and understanding living things are likely to come from better knowledge of complex but minute chemical substances.

For new methods of separating, detecting and analyzing colloids, particularly the large molecules of proteins and other substances, the 1948 Nobel prize for chemistry was awarded to Prof. Arne Tiselius, of the Institute of Physical Chemistry, Upsala University, Sweden.

Working in the tradition of Prof. The Svedberg of the same university, who won the same prize in 1926, this year's Nobelist

has developed two methods of analysis that are finding increasing use in investigational laboratories.

He applied electrophoresis to the separation of the heavy molecules of protein and other substances. He also worked out a new method of analysis based on adsorption and applied it to organic and biochemical problems.

The electrophoresis apparatus of Prof. Tiselius acts like a sorting machine for the separation of heavy molecules in solution. Prof. Svedberg is famous for his work on separating molecules and other substances



TINY ATOM-SMASHING MACHINE—This Westinghouse device is in reality a neutron counter which detects neutrons, vital building blocks in matter's structure which carry no electric charge. It is demonstrated by Dr. Kuan-Han Sun, Chinese-born Westinghouse research physicist. Containing a very small amount of uranium 235, it generates tiny atomic explosions to reveal the neutrons.

are of biological importance.

Adsorption is action of a substance holding another substance on its surface. It is adsorption, not absorption, which is what a sponge or piece of blotting paper does to water.

In past years various kinds of adsorption methods have been used in organic chemistry and biochemistry. Willstatter and his followers used adsorption for the differentiation of various enzymes. Chromatographic analysis which is being applied widely is based on adsorption phenomena.

Prof. Tiselius may be said to have mechanized and made automatic the method of adsorption analysis.

Previous investigators had shown that the chromatography of colorless substances was possible in some cases by observations of the various layers in the column of material upon which the substances being investigated had collected. When the various substances gave a color, their detection was relatively simple. When they were

colorless, it was sometimes possible to differentiate them by their fluorescence. Or the parts of the column could be tested with different specific reagents, either on the column directly or after it had been cut into sections and extracted.

Prof. Tiselius worked out a new and more general method. After passing through the column of adsorbent and before any mixing has taken place, the solution is allowed to flow through an arrangement for determining continuously the concentration by measuring some property of one of the chief substances passing through. This is done by connecting the outlet of the column to a small cell in which the refractive index, light absorption, conductivity or some other suitable property of the solution is observed continuously. The readings are plotted against the volume of flow. Apparatus that is self-registering and operates relatively automatically has been developed.

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Find Oil Off U. S. Coast

► LARGE petroleum accumulations exist under the American continental shelf and it is physically possible to get the oil from them, the American Petroleum Institute was told in Chicago by Mercer H. Parks and James C. Posgate of the Humble Oil and Refining Company.

Continental shelf petroleum production has passed the initial planning stage and as a result of successful drilling operations, at least two oil discoveries of possible major importance have been made, they said. These are both in the Gulf of Mexico.

Operations in open water encounter problems of the elements in addition to those usual on land. Auxiliary operations, such as transportation and drilling site preparation, they stated, become major items from technical and financial viewpoints.

The drilling sites now in use involve large platforms capable of supporting everything needed for drilling operations, as well as smaller platforms serviced by floating barges in a manner similar to that used in sheltered waters.

The two oil discoveries of possible major importance to which they referred are a producing well off Terrebonne Parish, La., of Kerr-McGee Oil Industries, Inc., and one drilled by the Humble Company off Jefferson Parish, La.

The first is a very shallow well, producing from a supercap sand through perforations about 1,750 feet deep. The Humble discovery came at a depth of about 8,650 feet in a second well drilled in the area. Until other wells are drilled, no proper evaluation can be made of the discovery, but the prospect is promising.

As generally understood, a continental shelf is the land mass lying submerged off the coast in less than some 600 feet of

water. The United States continental shelf covers 750,000 square miles, of which 129,000 are in the Gulf of Mexico. This strip averages about 75 miles in width. It is in this Gulf shelf that oil men expect to find the best oil reserves.

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GEOLOGY

Find Ancient Seas Were Warmer than They Are Now

► A HUNDRED million years ago the sea water off the coast of western Europe was warmer than it is now, with temperatures ranging from 64 to 80 degrees Fahrenheit. Evidence pointing to this conclusion was obtained in a hitherto unused way by Prof. Harold C. Urey and associates at the Institute for Nuclear Studies at the University of Chicago, who presented their data at the meeting of the Geological Society of America in New York.

The Chicago scientists have discovered that the limy shells of sea animals contain a slightly higher percentage of heavy oxygen than is found in the dissolved limestone (calcium carbonate) in the surrounding sea water. The difference is less when the water is warm, greater when it is chilly.

Assuming that conditions in ancient seas were the same as they are today, Dr. Urey and his group analyzed fossils from the chalk deposits of England, laid down as sea-bottom ooze in upper Cretaceous time, about 100,000,000 years ago. The limy remains of squid-like mollusks known as Belemnites proved to be their best "paleothermometer," with readings as stated.

Fresh evidence that this continent had human inhabitants during the Pleistocene

ice age has been found just south of the Scripps Institution of Oceanography at La Jolla, Calif., stated Dr. George F. Carter of the Johns Hopkins University. Here, in a river-deposited soil formation quite definitely of ice-age date, he found the charcoal of ancient fireplaces, stone tools, and shells left after the sea-food feasts of this long-gone people.

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MEDICINE

New Camera May Help Save Stomach Cancer Victims

► A NEW CAMERA which shows promise of saving victims of stomach ulcer by making mass X-ray detection studies possible was reported by Drs. John F. Roach, Robert D. Sloan and Russell H. Morgan, of Johns Hopkins Hospital, Baltimore, at the meeting of the Public Health Cancer Association in Boston.

Stomach cancer kills 60% of its 100,000 victims each year. The start of the disease is so insidious that there is no warning signal to attract either the patient's or his doctor's attention while the malignant growth is still in its early, curable stage.

The lens system of the camera uses reflection type optics. Its high speed makes it possible to get pictures for examination with one-twelfth the exposure to X-rays the patient would undergo with older equipment to get pictures giving the doctor the same amount of information for diagnosis.

The pictures are taken on 70-millimeter film and their low cost adds to their advantage as a mass stomach cancer detection method.

"A real reduction in the mortality of gastric cancer may be expected," the Hopkins doctors reported, if results with the camera during the first six months of a planned five-year study continue.

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GENERAL SCIENCE

British Rodman Medal Awarded to an American

► FOR THE FIRST time in its 13-year-old history, the British Rodman medal, awarded for outstanding work in photomicrography and related fields, is conferred upon an American. Harold F. Sherwood, of Kodak Research Laboratories in Rochester, N. Y., is the recipient. The award was made at the recent annual International Exhibition of the Royal Photographic Society held in London.

Mr. Sherwood exhibited microradiographs of thin sections of metal, wood and paper. Microradiography is a form of photography employing X-rays of low penetrating power. It is similar to medical and industrial radiography except that the X-rays used are of longer length. A typical microradiograph in his collection showed the depth of ink penetration in the paper of a postage stamp.

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CONSERVATION

U. S. Exceeds Soviet Plan

Russia's 15-year plan of conservation and land improvement has been more than matched in this country without need of an imposed, master-plan, expert says.

► RUSSIA'S ambitious program of soil conservation, irrigation and forest belt planting, to be carried out during the next 15 years, has already been more than matched in the United States, declares Dr. W. C. Lowdermilk, recently retired assistant director of the U. S. Soil Conservation Service. While not wishing to cast aspersions on the Soviet plans or to minimize their importance to the well-being of the Russian people, he considers it worth while to point out the record of accomplishment under the American system as a reply to the Kremlin's boast that a program such as theirs could not be put through under a capitalist economy.

Summarizing the recently published Soviet figures, Dr. Lowdermilk notes that their 15-year plan is to affect 300 million acres, with forest belts to be planted on 14 million acres, and 3,000 miles of long forest belts to protect cultivated land against winds blowing from desert areas. Grass and crop rotation systems are to be applied on 80 million collective farms, and 45 million reservoirs and ponds are to be constructed. Field-by-field conservation measures will be used on a total of 285 million acres.

Statistics of American land-use improvements which Dr. Lowdermilk has gathered from official sources do not exactly parallel the Russian figures, but many of the data are close enough to make comparisons interesting. There are, for example, 2,033 farm conservation districts, with a total of 1,114 million acres, of which more than 748 million acres lie within nearly four and one-half million farms and ranches. This movement is still spreading; 104 million acres in 207 new conservation districts were added in 1947.

Conservation surveys have been completed on farms with a total of more than 268 million acres, active plans for conservation are affecting nearly 158 million acres of farm and ranch lands, and conservation measures are being applied on 76 million acres. Wind and water erosion are being reduced by crop-residue management on well over 21 million acres, and by strip cropping on four million acres; 523,143 miles of terraces have been constructed. Range and pasture improvement methods have been put into use on nearly 47 million acres.

U. S. National Forests now cover 179 million acres; individual farmers are practicing woodland management on well over seven million acres of their own land. The U. S. Department of Agriculture has

planted 33,650 miles of field windbreaks in the West, in addition to an unknown amount of planting by farmers on their own initiative.

Some 21 million acres of previously desert land have been brought under irrigation, partly by the U. S. Reclamation Service, but partly also by private corporations.

All this has not been achieved under a single master-plan imposed from above, Dr. Lowdermilk points out. Rather, government action has been taken by executives and scientists who followed the wishes of the people as expressed through their duly elected legislators.

Some of the accomplishments, though already great, are of recent origin. Interestingly enough, the Tennessee Valley Authority is now just 15 years old. Longest record of accomplishments is that of the U. S. Reclamation Service, which began its work 46 years ago, in 1902, some 15 years before the unprogressive czarist regime was ended in Russia.

Reason enough exists, Dr. Lowdermilk admits, for the relatively late start of large-scale land-use improvement in the USSR. Practically nothing was done under the Czars, and Russia has in the present century had to bear the brunt of three major wars. Nevertheless, he feels, it would have been in better taste if the Soviet authorities had been content to announce their own praiseworthy plans, without adding the claim that such things cannot be done in a land where more than what they plan for the future already stands as a record of present achievement.

Dr. Lowdermilk's views will be given in full in the forthcoming issue of the national conservation journal, *THE LAND*.

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GEOLOGY

Geologists Ponder Over Dinosaur-Like Imprint

► DID A DINOSAUR lie down in the mud, near the present site of West Coxsackie, N. Y., leaving the imprint of his scaly hide which was subsequently buried in silt and hardened into a permanent stony record? Or is there a less dramatic explanation for the marks?

At the meeting of the Geological Society of America in New York, Dr. George H. Chadwick, consulting geologist of Catskill, N. Y., called the attention of his colleagues to the peculiar "dinosaur leather" markings on a vertical rock surface by the roadside.

about 100 feet wide and 50 feet long. He presented his observation as a challenge for investigation. It will be necessary to work fast, however, he said, since weathering will soon sponge out this puzzling record of the earth's dim past.

Science News Letter, November 20, 1948

ELECTRONICS

Electricity from Hair Sets Off Photo-Flash Tube

► THE CRACKLE of hair as combed by a girl has "electrical" value, a General Electric scientist said. The crackle is worth some 8,000 to 10,000 volts of potential electricity, he estimated.

The proof is that a GE photographer succeeded in making the crackle ionize a high-speed photo-tube, enabling a girl combing her hair to take a picture of herself engaged in the task.

In the method used, a metallic collector rod was attached to the comb employed. The rod was connected to the trigger electrodes of a photo-flash lamp. Each stroke of the girl's comb supplied the necessary 8,000 volts of power to set off the flash. The static electricity developed in combing the hair is low in comparison with that of scuffing the feet across a rug. In this latter case some 18,000 volts are generated, the scientist stated.

Science News Letter, November 20, 1948



"HAIR-POWER"—Each stroke with the comb generates 8,000 volts of potential electricity which in this picture was harnessed to the trigger of the photo-flash lamp. A single stroke through the hair set off the lamps, enabling the girl to take a picture of her friend and herself in this novel way.

ARCHAEOLOGY

Relics of Indian Culture Studied by Colombians

► REMAINS of a high Indian culture, rivalling the Mayan and Peruvian civilizations in its splendor, are being excavated and studied by archaeologists in Colombia, states Dr. Luis Duque Gomez, director of the Ethnological and Archaeological Institute at Bogota, now in this country on an exchange fellowship arranged by the State Department through the Smithsonian Institution.

Largest of these ancient cities is one now called Pueblito, near modern Santa Marta in northern Colombia. At this place there are stone foundations of more than 3,000 houses. It was inhabited until shortly before the Spaniards came to South America.

At San Agustin in southern Colombia is a huge cemetery, a "city of the dead" covering five square miles. It is filled with grotesque monuments, man-like in shape.

Like the Peruvian Indians and the Aztecs, these ancient inhabitants of Colombia had a corps of expert goldsmiths. Many of the gold objects found by the archaeologists, such as crowns, pendants and earrings, are of beautiful and delicate workmanship.

The government of Colombia has given these sites protection as national monuments, and is encouraging the training of young archaeologists. This work is under the direction of Dr. Duque.

Relatively few American archaeologists have done any work in the Colombian ruins, but Dr. Duque emphasizes that the cooperation of scientists from the United States will be welcomed, because there is so much to be done.

Science News Letter, November 20, 1948

METEOROLOGY

Rain-Maker Proposes Eliminating Lightning

► A RAIN-MAKER suggested the possibility of preventing lightning-caused forest fires by eliminating lightning itself.

The proposal comes from Dr. Vincent J. Schaefer of the General Electric Co., who developed the method, sometimes successful, of making rain or snow by scattering dry ice by airplane in clouds far above the earth.

The scheme for eliminating lightning, which he believes would be successful in certain areas under certain conditions, includes the transformation of towering cumulus clouds in the area to snow by the use of dry ice.

Thus, he said, instead of growing into highly unstable thunderstorms from which lightning is produced, the cumulus clouds either would precipitate out as snow and rain, or would become cirrus, or snow clouds, which do not produce lightning.

Dr. Schaefer's suggestions are included in a report of his summer's study of natu-

ral thunderstorm conditions, conducted at Priest River Forest Experiment Station, Idaho. In the general region of the station many hundreds of forest fires occur each year with an average of 1,100 caused by lightning.

The recommendation that dry ice, solid carbon dioxide, be used to transform the cumulus clouds was made to the U. S. Forest Service. Its Priest River Station is located in a region particularly well suited for such an experiment. The region has three "breeding" places for incipient thunderstorms. Due to local topographical features, these locations frequently cause highly-active towering cumulus clouds to develop. These often grow into thunderstorms.

Science News Letter, November 20, 1948

MEDICINE

Facial Paralysis Victims Respond to Treatment

► PATIENTS with facial paralysis, or Bell's palsy, do not have to sit around waiting for the paralyzed face muscles to recover while their doctor takes an "attitude of masterful expectancy." They can and should be treated, Dr. William Bierman, attending physical therapist at Mount Sinai Hospital, declared at the New York Academy of Medicine graduate fortnight.

He advocated the use of physical medicine such as early electrical stimulation of denervated muscles, but cautioned that massage of paralyzed muscles, especially in the face, should be very mild.

Voluntary exercise should be undertaken with great caution. In Bell's palsy, he explained, the healthy side of the face is stronger and since ordinarily the muscles of both sides of the face work together, the weak muscle on the paralyzed side is in danger of becoming stretched.

Science News Letter, November 20, 1948

AERONAUTICS

Supersonic Windtunnel Has Enclosed Airstream

► AN ENCLOSED airstream system which cleans and dries air for reuse has been installed in a small windtunnel at the University of Washington Aeronautical Laboratory in Seattle.

In a tiny opening two square inches, flying conditions at an altitude of 80,000 feet with a speed of 1,360 miles per hour are simulated. Modifications may give conditions up to an altitude of 200,000 feet at 2,000 miles per hour.

By using the enclosed slipstream, it is not necessary to continually remove moisture from outside air.

Although the actual test section is small, the complete unit, powered by four large vacuum pumps, is 20 feet long and four feet high.

Science News Letter, November 20, 1948

IN SCIENCE

CHEMISTRY

Rubber and Plastic Make Tough, Light Material

► A NEW, TOUGH, lightweight material made of combinations of natural and synthetic rubber with plastic resins has been disclosed by the Goodyear Tire and Rubber Company.

Copolymer resins with a high styrene content are combined with natural or synthetic rubber in the group of materials which have been given the name Tuf-Lite. First applications include several types of sports equipment such as helmets for football or polo, golf club heads, golf ball covers and both bowling balls and pins. Other uses for the material include mildew-resistant carrying cases and containers, clicker pads, electrotpe printing plates and other articles which need impact resistance and waterproof qualities.

Wide range of qualities, including colors, is possible with the resin-rubber blends, Goodyear scientists have discovered.

Science News Letter, November 20, 1948

MARINE BIOLOGY

Sponge Fishery May Help Economy of Philippines

► SPONGE FISHING may help the Philippine republic to build up its national economy, if preliminary promises of a survey being conducted for the Philippine government by the U. S. Fish and Wildlife Service are made good on a larger scale. Known sponging grounds in waters adjacent to the islands are chiefly in the Sulu and Celebes seas.

A minute beginning of a sponge-fishing industry was made in the Philippines before the war. There were two boats, carrying four divers and eight crewmen.

If sponges can be obtained on a large scale in the Philippines it will help the world as well as the islands themselves. Commercial sponge fishing is now confined to just two areas in the world: the Mediterranean sea and the Caribbean-Gulf region in the Western Hemisphere, and yields are falling off.

Estimated world production of sponges decreased from 2,450,000 pounds in 1938 to 860,000 pounds in 1947. The United States industry, confined to the west coast of Florida, yielded 606,000 pounds in 1938, and only 158,000 in 1947. Prices have increased so much, due to the scarcity of good sponges, that the small 1947 sponge crop brought nearly as much money as the four-times-larger 1938 yield.

Science News Letter, November 20, 1948

E FIELDS

PUBLIC HEALTH

No Need To Fear Atomic Bomb "Poisoned Water"

➤ YOU CAN TAKE one atomic bomb worry off your mind. That is fear of "poisoned water" after a bomb burst in or near the city water supply. If the city has a modern filtration plant, the water will be safe to drink.

That comes from Col. James P. Cooney, chief, special projects division, Office of the Surgeon General, Department of the Army. Said Col. Cooney at the meeting in Boston of the American Public Health Association:

"In case the water supply of a city is contaminated by fission products or unfissioned material from an atomic bomb, all the evidence on hand at present indicates that after passing through a modern filtration plant, the water at the tap would be safe to drink. More work will be done to prove or disprove this statement."

At the Bikini test water from evaporators used on the ship was found safe for drinking.

Other comforting facts presented by Col. Cooney: Immediately after a mid-air atomic bomb detonation it is perfectly safe to enter the area and rescue the thousands whose injuries will be such that they will not be able to walk. The residual radiation from an air burst atomic bomb is insignificant.

In case of an underwater or ground blast the radiation hazards would certainly be greater than from a mid-air burst but the blast and fire hazards would be proportionately decreased and, in Col. Cooney's opinion, the total number of casualties would be much less.

A large number of Japanese who had recovered from radiation sickness were examined and interviewed by Col. Cooney in August, 1946.

"They appeared perfectly normal and were handicapped in no way toward pursuing their way of living," he reported.

Science News Letter, November 20, 1948

INVENTION

New Electric Room Warmer Stores Heat in Soapstone

➤ AN ELECTRIC room warmer, that would come in handy now that evenings are growing chilly, has just been patented by Seymon Ria of Seattle. It is so built that it can store heat during daytime periods of off-peak loads, and release it when needed.

Heat storage is accomplished by means of cast blocks of soapstone—the same material that was employed in fireless cookers a generation ago, and as footwarmers in beds and buggies a generation before that.

In Mr. Ria's invention the blocks are hollow, with flue-like openings running up the middle, and with the electric heating elements embedded in the cast stone itself.

To protect the floor from excessive heating, the soapstone blocks are set on cement-bound cast stone blocks of a different type, in which the light, porous type of volcanic ash known as scoria is the chief ingredient. Scoria slabs also enclose the soapstone heat-storage blocks, giving good insulation.

Thermostatically controlled doors at top and bottom are closed during the time when heat is being generated and stored in the soapstone blocks, and opened automatically by thermostatic controls when the room temperature calls for a little more heat. An electric blower may be used if desired to speed the distribution of the stored warmth.

This invention is protected by U. S. patent 2,450,561.

Science News Letter, November 20, 1948

MEDICINE

Scientific Tests Show Fido Has Tough Stomach

➤ FIDO has a tough stomach. Its lining resists permanent damage by agents varying from zinc chloride and tannic acid to ultrasonic waves.

Evidence for this resistant ability of the lining of the dog's stomach was reported by Drs. John Regis Miller, J. F. Herrick, Frank C. Mann, John H. Grindlay and James T. Priestly, of the Mayo Foundation, at the meeting of the American College of Surgeons in Los Angeles.

Better methods for fighting stomach ulcer and stomach cancer were the goal of the Mayo scientists' studies. For over a century, scientists have been trying to find methods for determining whether hot foods, spicy foods or other substances taken into the stomach can irritate it sufficiently to cause an ulcer or cancer.

Since it is difficult to see what goes on inside the stomach, the Mayo scientists first tried to transplant part of a dog's stomach with intact blood supply to the outside of its belly. This was achieved, the dogs being anesthetized with ether for the operation which was done with sterile technique. The dogs were "entirely comfortable" with the transplants of stomach lining, and further tests, the scientists reported, "caused them no detectable discomfort."

Besides zinc chloride and ultrasonic waves, the scientists tested the effects of tannic acid, sodium morrhuate, oil of peppermint, protamine, water soluble vitamin K, quinone, various pituitary gland preparations, the fever cabinet, microwave, diathermy and ultraviolet radiation. Although these agents produced changes in the transplanted stomach lining, the scientists found the lining of the dog's stomach "remarkably resistant to permanent alteration produced by these agents."

Science News Letter, November 20, 1948

ENGINEERING

Million Barrels Daily Is Aim for Oil from Coal

➤ SYNTHETIC OIL from coal, to the tune of 1,000,000 barrels daily, was given as the objective of a program outlined to the American Society of Mechanical Engineers in White Sulphur Springs, W. Va., by J. D. Doherty of the U. S. Bureau of Mines. The cost of production, he said, should be approximately 12.5 cents per gallon.

Describing work in research and development already under way by the Bureau of Mines and others in the production of synthetic oil, he called attention to the need for prompt erection of at least some commercial plants because synthetic liquid fuels are not going to do us much good in an emergency if we have to start from scratch.

A completely new and detailed estimate of the coal reserves of the United States is being made by the U. S. Geological Survey, the engineers were told by Paul Averitt of the Survey staff. It will take 10 years to complete.

The coal fields of the United States are large in all dimensions, he said. They cover roughly 350,000 square miles, or approximately one-ninth of the total area of the nation. The coal-bearing rocks commonly are several thousand feet thick and, as in West Virginia, contain as many as 117 named and correlated coal beds.

Science News Letter, November 20, 1948

ICHTHYOLOGY

Plow Seaweeds Under to Feed Fish in Malaya

➤ SEaweeds are "plowed under" to feed fish by peasant fishermen of Far Eastern shores, just as plants on land are plowed under as green manure in Western agriculture, D. W. LeMare of the Federation of Malaya and Singapore Fisheries Department has reported to the editor of NATURE (Oct. 30).

They have various ways of fertilizing their seaside fish ponds, which are usually formed by fencing off small arms of the sea. When the seaweeds become too thick for the fish—which do not want them for food—the peasants drain the pond, except for a small puddle at its bottom. Then they seine the fish out of this, to sell or eat.

In the Malayan region, they let the seaweed die and rot on the bottom, then spade it in as fertilizer. On the southern coast of China they haul it ashore and make it into compost heaps. This material is eventually returned to the ponds as fertilizer. On the shores of the Straits of Malacca, between Malaya and Sumatra, the peasants seine out myriads of tiny fish, useless for human food, and give them to pigs and ducks. Refuse from these animals' pens is used to fertilize the fish-producing water.

Science News Letter, November 20, 1948

AGRICULTURE

Thanksgiving for All

The food situation has improved all over the world. In America the harvest is the most bountiful since the Pilgrim Fathers landed.

By N. E. DODD

Director-General of the Food and Agriculture Organization of the United Nations.

An Oregon stock and grain farmer, Mr. Dodd came to his present position after serving as Undersecretary of Agriculture. In this article he describes how the scientific agriculture which keeps America well fed is being used to help peoples throughout the world solve their own food problems—and raise their own Thanksgiving feasts.

► NEVER in all the three centuries since the Pilgrim Fathers kept that first Thanksgiving Day on American soil has the annual harvest festival concluded such a fruitful season as that now coming to a close.

While we in the United States rejoice that we have enough and to spare, the rest of the world joins us. For, although harvests elsewhere are more bountiful than they have been in recent years, the world still needs the mighty production of America to help feed the hungry millions.

In fact, the world will always need to draw upon this continent for our extra production—production that arises not only from a fruitful soil, but from the application to agriculture of advanced scientific technology.

It is, I think, cause for thanksgiving even greater than the bountiful harvest that the nations of the world have joined to share their knowledge of production and distribution in common action through FAO. In this fact lies the seed of more bountiful future harvests everywhere, with a gradual rise in the health and well-being of all mankind.

Renewed Mankind's Hopes

This year of generally good crops has unquestionably renewed mankind's hopes for the future, and so has relieved at least some of the fears and tensions which have made the world so uneasy since the war. Like the Pilgrim Fathers of Plymouth Colony with their good crops after that first bleak winter, the world has strength and hope to rebuild, to plan anew for peace and prosperity.

This year's 3,500,000,000-bushel corn crop will be the largest in United States history. Wheat will be only some six percent below the 1,365,000,000 bushel record crop of 1947, and 36% above the 1937-46 average. The oats crop is the third largest in the country's history. Grain sorghum production will be 28% and soybean production 53% above 1937-46 averages.

During the last two years (1946-47 and 1947-48) the United States exported about one-half of the bread grains that went into

the world market and this comprised about a third of the total production of bread grains in the United States.

In spite of great effort and substantial progress, European production still falls short of normal requirements, with net production of food some 26% below prewar. Only Sweden, Switzerland and Britain have succeeded since the war in bringing their volume of food production above the prewar levels. Not only the destruction and disorganization of the war, but unfavorable weather in the two seasons preceding 1948 have contributed to the shortfall of European production.

In the Far East, the 1948 harvests are above those of 1947 but still below prewar production except in Siam, the Philippines, India and Pakistan, where they only slightly exceed prewar averages. But the Far East as a whole is not meeting its own needs. Before the war, the region was a net exporter of important staple foodstuffs; since the war it has been a net importer, thus placing additional demands upon traditional exporting countries.

Food Situation Improved

Elsewhere in the world—in the Near East and on the African continent, in the Soviet Union, Oceania and Latin America—the food situation is definitely improved over that of the previous year and in most places over the prewar years.

But even such good harvest and the progress made so far is not good enough. Even before the war, millions of people were not adequately fed. In the last ten years, population has grown by 200 million—roughly the equivalent of the North American continent's population. Every morning there are 55,000 more people for breakfast than there were the morning before, and production does not yet match this rate of rise in population.

This is why there is great cause for thanksgiving that the peoples of the world are showing such willingness to work together to increase production and improve distribution of the products of the soil and the waters.

For the last ten days, the Conference of FAO has been holding its Fourth Annual Session in Washington. This world food parliament of 57 nations—the largest international gathering ever held in Washington—is reviewing the state of food and agriculture in the world. It is studying the programs of the member nations in their efforts to improve the situation, and endeavoring to integrate these programs better. It is reviewing the progress made to

date and the needs which remain. It is planning further action, both national and international, through FAO.

These plans of work include such broad intergovernmental action as continuing the system of international allocation of scarce foodstuffs until total supplies are more adequate. They include, likewise, such fundamental workaday jobs as spreading the use of hybrid corn seed, immunizing cattle against rinderpest, and ratproofing and fumigating grain storage. In all of these, national action has been aided by FAO.

Hybrid Seed Corn

North American hybrid seed corn has been introduced into Europe and schools held on corn breeding. If the 20% increase in production attributed to hybrid corn in North America can be achieved in Europe, the increase in production there would equal a third of that continent's needs of imported coarse grains to rebuild its livestock production.

In China alone, a million cows and buffaloes a year are killed by rinderpest. These animals not only produce milk and meat, but draw rice farmers' plows. Mass production of avianized vaccine in China will make it possible to immunize 15 million animals south of the Yangtze river in a project now under way.



TWO FARMERS TALK CORN—
Director-General Norris E. Dodd of FAO examines a sample of the world's hugest corn crop on the farm of J. J. Hutten, near Brookville, Md.



PRIMITIVE FARMING—This Korean farmer is his own beast of burden. Such inefficient farming methods need to give way to more modern ones, in order to abate the world's hunger.

The toll of stored bread grains and rice taken by rats, insects and fungi has been estimated as equalling the amount of world trade in grains. Saving even a small percentage of the present loss would help to close the gap between the grain available

and the grain needed to feed the world better.

The harvest of scientific research, like the harvest of the earth itself, is being put to work for the universal well-being of mankind.

Science News Letter, November 20, 1948

ARCHAEOLOGY

Ruins of Pagan Temple

► **COLOGNE CATHEDRAL**, Germany's most magnificent place of Christian worship, stands on a site devoted in pre-Christian times to the service of the pagan gods and goddesses of Rome. A discovery made during the war, when a bombproof shelter was being dug near the cathedral, appears to be the remains of a structure dedicated to Dionysos, the ancient Greco-Roman wine-god. Details of the find are given by Dr. Ernst Wilhelm Gerster, of the Roman-German Museum of Cologne, in the scientific journal, *FORSCHUNGEN UND FORTSCHRITTE* (April).

When the diggers of the bomb shelter first found the buried ruins, they were thought to be the remains of a palace—possibly the Roman governor's dwelling. The building had been large, with over-all dimensions of approximately 270 by 330 feet. There were many rooms, but the center of interest proved to be a hall about 23 by 33 feet, apparently used for feasting.

This room had an elaborate mosaic floor, with six large pictorial panels and many smaller designs. The smaller mosaics depict good things to eat: fat ducks, peacocks, turtles, oysters, baskets of fruit. One of the larger pictures is of Cupid riding on a lion. The other five depict a satyr and a maenad—male and female followers of Dionysos—in successive stages of the wild ecstatic dance that featured the worship of the god.

It is known that Dionysos-worship involved festivities of a kind that early Christians regarded simply as orgies, so that decorations that might seem more appropriate to a Roman night club would not be at all out of place in the wine-god's house. And since grape-culture and wine-making were brought to the Rhine valley by the Romans, a great temple to Dionysos would be definitely appropriate in the city they built on the river.

Science News Letter, November 20, 1948

"There are no problem children, only problem environments and parents."

EMOTIONAL MATURITY

by LEON SAUL, M.D.

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Do You Know?

Good *lipstick*, because often in close touch with food, is made to the same standards of purity.

Glutamic acid, used in food-flavoring and in medicines, is a by-product of beet-sugar manufacturing.

Automobiles should be driven slowly in cold weather until the engine is heated to normal operating temperature.

Approximately half the *gas* used in homes and other places in a Pennsylvania coke-making town is by-product gas from local coke ovens.

Grasshopper and cricket eggs are laid during late summer and remain in the soil until spring when they hatch and the insects emerge.

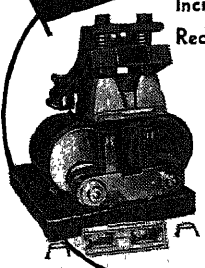
Although Australia produces nearly 2,500,000 pounds of *hops* each year, it does not grow enough to meet the needs of its domestic breweries.

A Salvadorian government agency is planning to mount some of its employees; it has asked for bids on 50 American *bicycles*.

One kind of horse is a well-known animal, but in a steel mill a *horse* is a chunk of iron which solidifies in the bottom of a blast furnace.

An early *match* was made with wood sticks coated with a mixture of potassium chlorate and sugar and tipped with sulfur; it was ignited by sticking it into shredded asbestos impregnated with concentrated sulfuric acid.

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MEDICINE

Vaccine Hits Women More

➤ **INFLUENZA VACCINE** produces a more severe reaction in women than in men, the 76th annual meeting of the American Public Health Association was told in Boston.

Absenteeism among inoculated women was four times higher than in men, a study of 4,217 workers at the Prudential Insurance Co., Newark, N. J., revealed. Dr. Joseph F. Sadusk of the Research and Development Board, National Military Establishment, Washington, D. C., directed the study with the assistance of Prudential's researchers, Preston C. Bassett and John S. Meddaugh.

"These reactions," Dr. Sadusk points out, "should not prove a deterrent to vaccination of industrial populations since they are mild and the degree of absenteeism is low."

Infants and children can be protected from the ill effects following influenza vaccine injections if they are inoculated with small amounts of vaccine over short intervals of time, another research team reported to the meeting.

"Reactions to influenza virus vaccine administered to infants and children are due in most instances to the amount of virus in the vaccine," they discovered in their study made at the Sarah Fisher Home, Farmington, Mich. The tests were made on 93 children whose average age was 3.2 years, according to Dr. J. J. Quilligan, Jr., Dr. Thomas Francis, Jr., and Elva Minuse, of the University of Michigan.

A new strain of virus is claimed to be responsible for California's two influenza epidemics during the past two years by Dr. George Meiklejohn, of the State's Viral and Rickettsial Disease Laboratory, Department of Health in Berkeley.

He said the population had little resistance and vaccines had little effect on this strain which showed a sharp difference from Type A influenza strains isolated in 1943 and in earlier years.

Influenza virus was found in the throats of a group of boys more than a month before an epidemic broke out and during the epidemic. During the 32 days they harbored the flu virus they showed no symptoms of the disease, Dr. R. M. Taylor, director of the International Health Division Laboratories of the Rockefeller Foundation, pointed out.

Some 800 boys between 17 and 21 years were subjects of the survey made in a state vocational school. Subsequently there were 32 cases of flu.

No significant difference in the attack rate of the disease was noted among those who were inoculated with either commercial A or B type mixed vaccine and the unvaccinated, Dr. Taylor said.

Data on an Army post which was vaccinated against flu virus with two vaccines, one incorporating a new strain, were pre-

sented to the meeting by Dr. James E. Salk of the University of Pittsburgh School of Medicine, and Capt. Philip C. Suriano, M. C., Fort Dix, N. J.

Fewer individuals were admitted to the hospital for respiratory disease from the group given the new vaccine, they found.

Science News Letter, November 20, 1948

PHYSICS

Nitrous Oxide May Be In Whole World's Atmosphere

➤ **NITROUS OXIDE**, familiarly called "laughing gas," is probably present throughout the whole world's atmosphere. At least scientists have just learned that there's about as much of it in the atmosphere above England as there is above the United States.

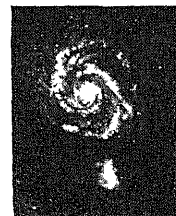
Existence of the gas nitrous oxide in the earth's atmosphere in sufficient quantity to record itself on spectrum photographs of the sun's rays passing through the earth's atmosphere was established several years ago by Dr. Arthur Adel of the Randall Laboratory of Physics, University of Michigan. Now J. H. Shaw, Dr. G. B. B. M. Sutherland and T. W. Womell, all of the Solar Physics Observatory in Cambridge, England, have shown that about as much exists in the atmosphere above that observatory as was found in America.

Just how high above the earth's surface the majority of this gas is concentrated has not yet been determined. If most of it is in the upper atmosphere, this layer may be largely responsible for keeping the temperature of the lower atmosphere fairly uniform, the physicists report in the American Physical Society journal, *PHYSICAL REVIEW* (Oct. 15).

Science News Letter, November 20, 1948

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ASTRONOMY-PHYSICS

Rocket Space Ship

► WHEN rocket ships fly out into space beyond the earth, they will not be in great danger of being hit by the missiles from outer space that are called meteorites.

Anticipating space ships or artificial "moons" that circle the earth as satellites, G. Grimmering, Douglas Aircraft Co. scientist, has investigated what would happen if rockets were launched to travel above the earth's atmosphere.

Skin covering for a space craft of stainless steel or duraluminum need be no thicker than that presently used in high-speed aircraft in order to withstand the hail of cosmic dust that can be expected above the earth's atmosphere. The most frequent meteorites are the tiniest. Some are so small that they barely escape being whisked out beyond the solar system by the pressure of the sun's radiation. A rocket ship can expect to meet these smallest sub-microscopic motes about once every second, but with no more effect than to receive a tiny blemish on its polished hull.

The larger the cosmic fragment, the rarer it will be. Mr. Grimmering's calculations

show that any meteoritic particle large enough to puncture a stainless steel hull a twentieth of an inch thick would be so rare as to be encountered by a rocket ship on the average of only once in 15 years of flight. Even then, the penetrating fragment would be very tiny, having about the diameter of the shaft of an ordinary pin. A pin-hole puncture would result, but there is a good chance that it could be located and patched.

It would be an almost inconceivable rarity for a rocket ship to meet a meteorite of the size that we usually imagine, such as the diameter of a baseball or even greater.

From Mr. Grimmering's study, it can be concluded that until present rocket engines and their explosive fuels are made much safer and until someone devises a safe technique for landing a rocket craft, the hazards from meteorites will be the least of the worries of high-flying astronauts.

The investigation was reported to the American Institute of Physics' JOURNAL OF APPLIED PHYSICS (Oct.).

Science News Letter, November 20, 1948

CHEMISTRY

Hints on Laundering

► IF THE WATER in your locality is fairly soft, be sure to use soap rather than synthetic detergents in laundering. Where the water is hard, synthetic detergents in most cases will clean your clothes better than soaps, particularly when only a small amount is to be used.

Both soap and synthetic detergent clean your cottons better, irrespective of the hardness of the water, if you heat the water to about 140 degrees Fahrenheit.

This is the practical advice given to members of the American Association of Textile Chemists and Colorists meeting in Augusta, Ga., by Miss Margaret S. Furry, Division of Textiles and Clothing of the U. S. Department of Agriculture.

Laundering tests leading to these results were conducted by Miss Furry, Dr. Verda I. McLendon and Miss Mary E. Aler at the Department of Agriculture in an attempt to help homemakers get the best results from home laundering of clothing and household fabrics. Soaps and synthetic detergents now on the market were tested for their ability to remove soil under conditions similar to those used in millions of homes throughout the country on wash day. Fifteen soaps, one soap powder and 35 synthetic detergents, chosen to represent the various classes now commercially available, were examined.

First, strips of bleached percale sheeting were artificially soiled in a mixture of graphite, tallow and mineral oil, then dried. These were laundered for 15 minutes in the launder-ometer, in waters heated to both 105 and 140 degrees Fahrenheit. Both distilled water and water of two degrees of hardness were used. To discover how much detergent must be used for maximum cleanliness, five different concentrations were employed.

Only three soaps and five detergents, representative of the various classes, were employed for the more detailed tests. The other detergents were evaluated at one temperature and one concentration only in both distilled and hard water.

The non-ionic synthetics were found the most efficient of the synthetic detergents

tested in removing soil. In distilled water, they were quite as effective as the standard soap. The cationic synthetic detergents were the least effective. In distilled water they were only about a quarter as efficient as the standard soap.

Science News Letter, November 20, 1948

ENGINEERING

Wasted Airplane Exhaust Will Add Jet-Propulsion

► WASTED ENERGY in the exhaust gases of an airplane engine is to be put to work in a new engine under development for the U. S. Air Force. The new engine will deliver some 4,000 horsepower to a propeller as well as several hundred pounds of jet thrust.

This piston-jet propulsion combination consists of a 28-cylinder Pratt and Whitney Wasp Major engine with a General Electric two-stage turbosupercharger which utilizes the engine's hot exhaust gases in two ways.

The turbosupercharger first uses the gases' energy to supercharge all combustion air required by the engine. It then discharges the gases to the rear through an orifice, the size of which is varied to obtain the best division of exhaust energy between supercharging and jet thrust.

This new combination powerplant, which will be known as the Wasp-Major-VDT, will be used first on the Air Force's Boeing B-54, an extended development of the famous B-29 and of the newer B-50. It is expected to enable heavy, long-range aircraft to fly farther, faster and higher. It will enable planes to take off with heavier loads of cargo, fuel or bombs, and to climb more rapidly. The VDT, by saving formerly wasted energy, is a fuel economizer. The new combination engine is already undergoing flight tests.

Science News Letter, November 20, 1948

Scientists are attempting to develop a sugarcane for America that will shed its lower leaves and leaf sheaths so that machine harvesting can be speeded up; they are crossing an American cane with a Burma variety that has this property.

Over-dried popcorn will not pop well.

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Books of the Week

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BIRTHDAYS DON'T COUNT—*New York State Joint Legislative Committee on Problems of the Aging*, 326 p., illus., paper, free upon request direct to publisher, 94 Broadway, Newburgh, New York. Authorities discuss multiple social, psychological and medical problems of the increasing number of old people.

COMMERCIAL PHOTOGRAPHIC LIGHTINGS—Charles Abel—*Greenberg*, 272 p., illus., \$7.50. A beautiful book for either professional or amateur photographer generously illustrated with photographs for which technical data are provided.

CYBERNETICS: Or Control and Communication in the Animal and the Machine—Norbert Wiener—*Wiley*, 194 p., \$3.00. This work developed from a new trend toward study of problems cutting across the various disciplines of science. Dr. Wiener has selected the problem of manipulation of information and communication whether it be between persons or groups, within the nervous system, or in the world of machines. Of interest to all those having to do with scientific method.

DICTIONARY OF GENETICS: Including Terms Used in Cytology, Animal Breeding and Evolution—R. L. Knight—*Chronica Botanica*, 183 p., \$4.50. The author hopes that writers will not continue to coin new terms when one of those listed here would serve the purpose.

THE DRUGS YOU USE—Austin Smith—*Revere*, 243 p., \$3.00. Telling the patient in non-technical style about what the doctor pre-

scribes and why.

THE FERNS OF MAINE—Edith Bolan Ogden—*University Press*, 128 p., illus., paper, \$1.00. Describing 19 genera divided into 99 entities.

HEALTH INSTRUCTION YEARBOOK 1948—Oliver E. Byrd—*Stanford University Press*, 320 p., \$3.50. A condensation of 321 articles on health. Surprisingly, one of the most important sources was the Congressional Record.

LEARNING AND WORLD PEACE: Eighth Symposium—Lyman Bryson, Louis Finkelstein and R. M. Maciver, Eds.—*Conference on Science, Philosophy and Religion (Harper)*, 694 p., \$6.50. Answers by specialists in diverse fields to the question, "How can scholarship contribute to the relief of international tensions?"

ONWARD MOTIVES IN RESEARCH—Edward R. Weidlein—*Mellon Institute of Industrial Research*, 7 p., illus., paper, free on request direct to publisher, University of Pittsburgh, Pittsburgh 13, Pa. The Priestley Medal Address.

RADAR PRIMER—J. L. Hornung—*McGraw-Hill*, 218 p., illus., \$2.80. Interesting reading for the layman, but containing all the facts necessary for a text on radar. The author was formerly in charge of the radar school at MIT.

UNDERSTAND YOUR CHILD—FROM 6 TO 12—Clara Lambert—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. Helpful information and advice for parent and teachers.

Science News Letter, November 20, 1948

were turned into the Jordan through a four-mile tunnel under the mountains. This would also provide hydroelectric power for use in Lebanon.

South of Beersheba, he continued, there is a strip of country suitable for dry farming. By careful use of dust-mulching methods, it can be made to yield a crop of barley every other year. Beyond this dry-farming area, grazing can be continued.

Another possibility, he suggested, would be the cultivation of natural desert plants from which a profit can be made, like guayule for rubber.

The Negeb has seen more prosperous days, Dr. Lowdermilk stated. It was a well-cultivated country when it was part of the Byzantine Empire. When he was there on an earlier trip, he flew over much of it in a plane, and could see the lines of old irrigation canals and the sites of old dams, that kept the land watered in the fifth and sixth centuries A. D. He could even see where accumulated silt had been cleared out from above the dams, and piled on shore.

Then the power of Byzantium began to crumble before the onset of the new power of Islam. Mohammed's followers, like the Prophet himself, were herdsmen, not farmers. They let the irrigation system go to ruin, and they devoured the land with the unsparing teeth of their sheep, goats and camels. So the Negeb sank to its present low state, where it will stay until modern engineering brings it the waters of salvation.

Science News Letter, November 20, 1948.

AGRICULTURE

Negeb Has Good Soil

► THE NEGEB, disputed arid southern end of Palestine, could support five times its present population of 50,000 if properly irrigated and scientifically farmed. So declared Dr. W. C. Lowdermilk, formerly of the U. S. Soil Conservation Service, who has just returned from a long stay abroad, during which he spent several months studying conditions in the Mediterranean region.

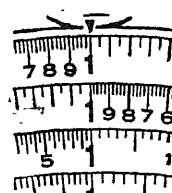
A considerable part of the soil in the Negeb, he stated, is of the fine-grained type known as loess, similar to the fabulously productive corn-land of western Iowa. Only it doesn't get enough water on it. Annual rainfall at Beersheba, traditionally the southernmost town in ancient Israel, is only eight inches. A little to the northwest, at Gaza, where Samson met Delilah and other troubles, it is 14 inches.

Here and there, unhappy Arabs carry on "patch farming" on favorable spots, but for the most part the nomad population makes a living (such as it is) by pasturing sheep and goats. Goats are the damnation of a land, in Dr. Lowdermilk's opinion. They begin where the sheep leave off, and where

they leave off no other animal can find a mouthful. Then drought claims the country, plus fierce erosion when the occasional cloudbursts come.

By diverting water from the Jordan river into irrigation canals, Dr. Lowdermilk said, 80,000 acres of this stripped and barren land could be made fruitful again. To this another 100,000 acres could be added if water from the Litani river in Lebanon

THE BINARY SLIDE RULE



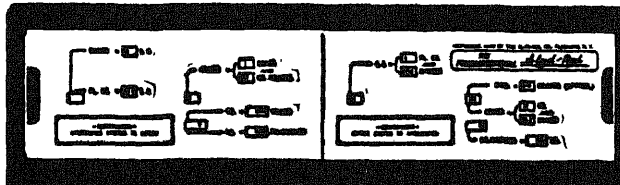
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⚙️ **FASTENER** for farm gates or dog kennels, safe from chance opening by the animals themselves, is a metal bar six to 12 inches long with a hole at one end for a holding staple and a hinged hook-like device at the other to fit into another staple. To open, this hook must be lifted by the fingers.

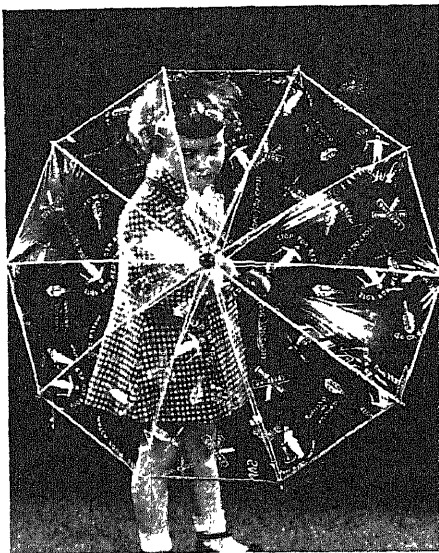
Science News Letter, November 20, 1948

⚙️ **PACKAGING MACHINE**, probably the world's largest, automatically wraps stacks of a half-dozen sheets of insulating wall-board four feet wide and ten feet long at a rate of two packages a minute. With it, two men will do the work that requires 16 by hand methods.

Science News Letter, November 20, 1948

⚙️ **FREE-FALL CONTAINER**, to drop supplies from an airplane, has hinged wings on two sides which open by air pressure at the beginning of the descent. They are so placed that they cause the box-like container of this recently patented device to rotate as it falls, decreasing its speed sufficiently so that it hits the ground with very little force.

Science News Letter, November 20, 1948



⚙️ **TRANSPARENT UMBRELLA**, shown in the picture, provides safety from showers and also safety from traffic. This child-sized protector, with a clear, durable plastic top, is fun to carry because on it are

printed in red or green pictures of policemen and safety mottoes.

Science News Letter, November 20, 1948

⚙️ **COCKTAIL SHAKER**, bottle-shaped and made of stainless steel, has a cylindrical lower section to hold the liquor and ice, and an overfitting top section the shape of a bottle neck. The shaker is large enough to hold an unopened bottle of liquor to protect it from breakage in traveling.

Science News Letter, November 20, 1948

⚙️ **PLASTIC TRAY**, which fits into a drawer of a woman's vanity or dressing table, has compartments divided in such a way that there is a place for each article used. Nail files, orange sticks, combs, brushes, powder puff and powder can be neatly stored and easily reached when wanted.

Science News Letter, November 20, 1948

⚙️ **FOLDING SKI**, recently patented, comprises a front and a rear section, both of which can be moved in and out of an interlocking engagement, and a hinge member including a hinge plate rigidly secured to one ski section. A guide plate has one end hinged to the hinge plate.

Science News Letter, November 20, 1948

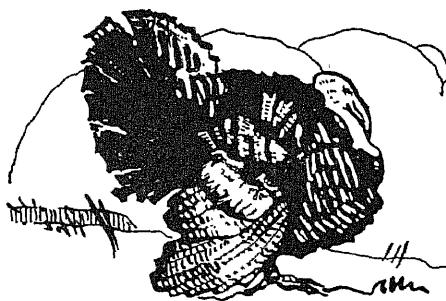
• Nature Ramblings by Frank Thone •

➤ **THANKSGIVING** Day posters, magazine covers and other popular art almost always show a stalwart-looking Pilgrim Father carrying a bell-muzzled gun and a big turkey-gobbler, with maybe a very pretty Priscilla in the background. It's a nice picture; the only thing the matter with it is that it isn't accurate.

That bell-mouthed firearm, for one thing, isn't an early seventeenth-century fowling-piece. It is a blunderbuss, a "scatter-gun" type of weapon used in its day very much as the sawed-off shotgun was used in Wild West days—as a defensive arm carried by stagecoach guards for the discouragement of highwaymen. It is not even certain that the Pilgrims knew what a blunderbuss was; its first known mention in English print was in 1654, which was 23 years after the first Thanksgiving Day.

The turkey shown in the picture usually looks altogether too much like the domestic birds we commonly see in farmyard and

Thanksgiving Anachronisms



market. True enough, our domestic turkey is a native of the Western Hemisphere, and is closely related to the wild turkeys the early English settlers hunted in the woods, but it is not the same species. There is a strong resemblance between domestic and wild turkeys, but the wild turkey has light

brown or chestnut tips to its tail-feathers, instead of white. Also, present-day domestic turkeys are usually larger than the wild ones.

The history of our familiar Thanksgiving bird is a strange one. The early Spanish voyagers and conquerors found, among the very few domestic animals kept by the natives of Mexico and Central America, this very meaty and desirable fowl. They took some back to Europe, where they were presently all around the Mediterranean basin. Thence they worked their way westward again, largely by way of the Danube valley, bearing with them the misnomer that they have never got rid of, falsely ascribing them to a Turkish origin. Finally, from England they were carried back across the Atlantic, to the North American colonies. It is the same story, essentially, as that of the white potato, that frequently flanks the turkey on our Thanksgiving tables.

Science News Letter, November 20, 1948

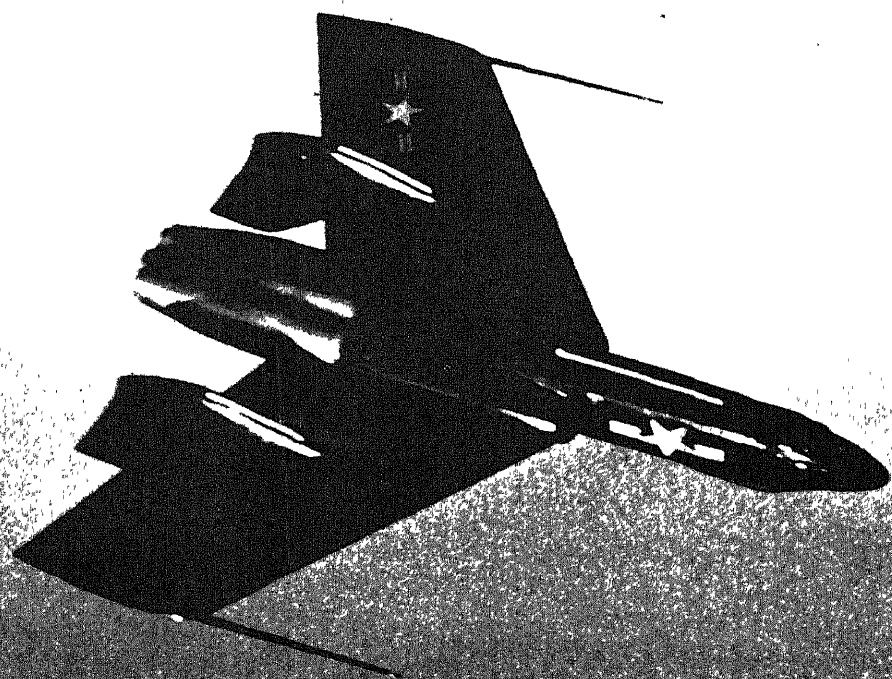
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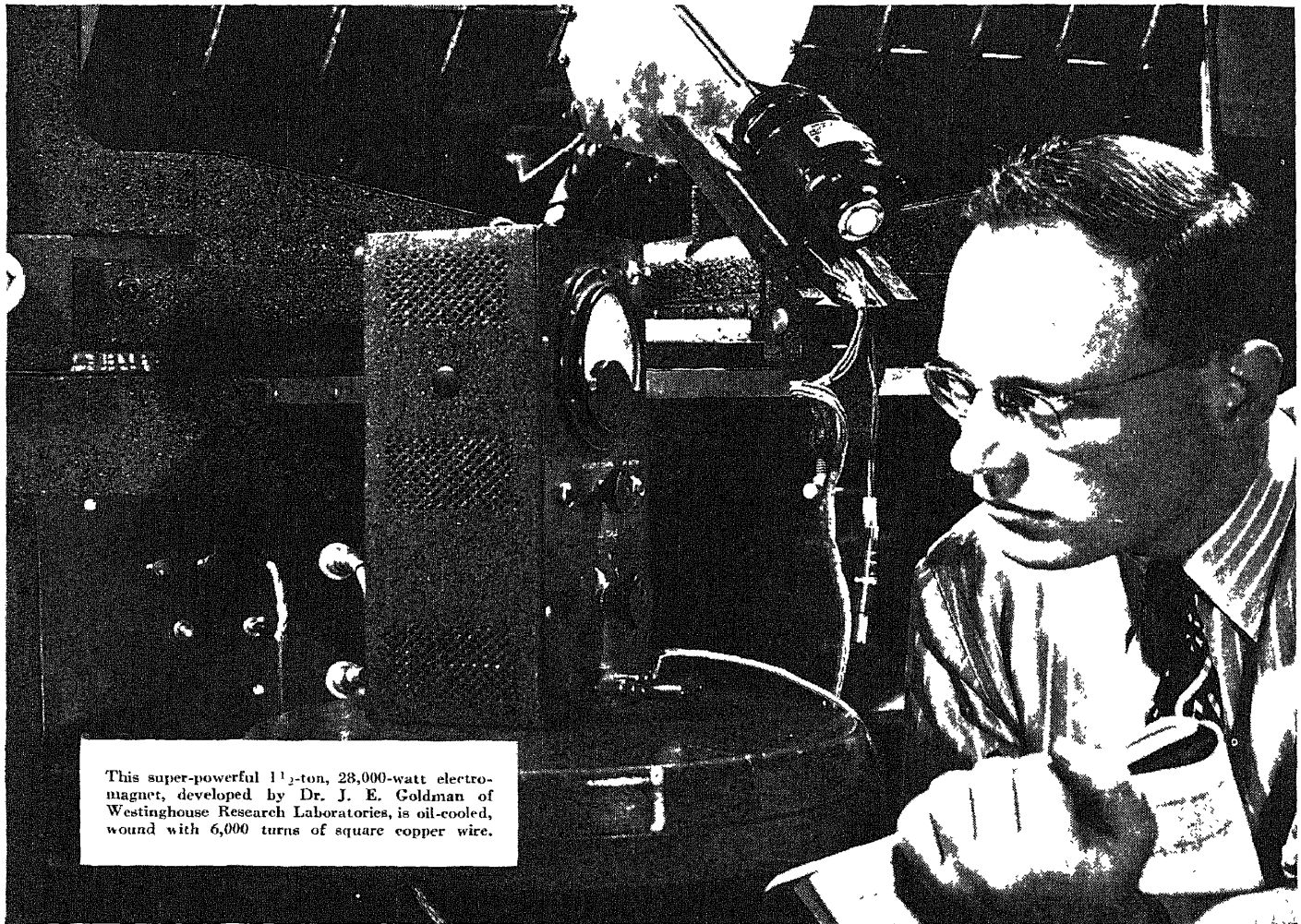
See Page 344

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YOU CAN BE SURE..IF IT'S Westinghouse



This super-powerful 11½-ton, 28,000-watt electromagnet, developed by Dr. J. E. Goldman of Westinghouse Research Laboratories, is oil-cooled, wound with 6,000 turns of square copper wire.

Magnet "Picks Pockets" Two Feet Away

Enough strength is packed between the poles of this new electromagnet to support a 4,000-pound automobile. It will pick the pockets of the operator standing two feet away and stop his watch at four feet.

One secret behind this magnet's extra power is the special alloy in the pole tips. It was developed by the Westinghouse research laboratories, and gives more magnetic energy than ordinary iron.

But more important, it opens doors to new

studies in magnetism and its practical applications—for example: in designing cyclotrons; in the production of smaller and lighter aircraft instruments; and as a research tool for studying the relationship between the crystal line structure of metals and their magnetic properties.

No matter what immediate results accrue from this new electromagnet, Westinghouse research engineers will continue to look for ways to help industry and science move ahead.

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MEDICINE

Fat Injected into Veins

Vein feeding with fat is a quick way of restoring lost weight in patients who are ill or recovering from sickness because it gives calories quickly.

➤ A QUICK WAY of getting fat, designed for very thin, sick people who cannot eat much, has been developed by Dr. Frederick J. Stare, professor of nutrition at Harvard School of Public Health.

It is done by injecting fat into the veins. The fat, which may be butter, coconut oil or corn oil, is first broken into very tiny particles in a "souped-up" dairy homogenizer. Unless they are extremely small, the fat particles can cause dangerous and even fatal embolism.

Advantage of using fat instead of sugar for the vein feeding to fatten sick persons is that with fat 15 times as many calories can be given in the same amount of fluid.

The body uses the fat very rapidly, Dr. Stare told members of the American Public Health Association at their meeting in Boston. Within six to seven hours it has reached the fat depots in the body. When fat made with radioactive carbon 14 was injected into the veins of rats, the animals were exhaling the radioactive carbon on their breath within less than the 10 minutes it took to get them into a machine for collecting the breath.

Patients will not be getting fat-by-vein

feedings just yet because a satisfactory stabilizer for the emulsified fat has not been found. The one first used was all right for rats and dogs but gave a fever to the first patients who got it. The stabilizer first used, however, may become useful to patients with high blood pressure. Along with the fever, it caused a drop in pressure. When given to cats, this drop was both considerable and prolonged, lasting for five or six hours. Dr. Stare and associates plan as soon as they have time to try combining it with protamine zinc, used for slow action insulin, to see whether they can get a long acting blood pressure lowering agent.

The fat-by-vein feeding method may make possible the giving of fat-soluble chemical remedies and may also lead to new knowledge of cancer. The latter, already under study, would come through injection of cancer-causing chemicals into a rat's vein. Information about the possible cancer-causing ability of chemicals could be gained faster this way than through the tedious one of painting the chemical on the animal's skin.

Science News Letter, November 27, 1948

ENGINEERING-CHEMISTRY

Damage from Antifreezes

➤ SALT-BASE antifreezes in the radiator of your car can ruin its cooling and ignition systems, National Bureau of Standards scientists have found in new tests.

A complete series of engine tests by Bureau scientists, Donald B. Brooks and Ronald E. Streets, revealed that salt-base anti-freezes are likely to corrode engines, necessitating replacements of radiators, water pumps, and cylinder heads. Products of the corrosion will clog up water passages in the radiator, causing overheating and boiling. No known inhibitor can prevent their corrosive action, the scientists state in a newly-published Bureau circular.

Recommended for automotive antifreeze use are the alcohols and the glycols. Petroleum-base antifreezes should be used only if your car is equipped with certain types of synthetic radiator hose. These antifreezes will attack natural or reclaimed rubber.

The safest antifreezes, simple alcohols and glycols, will not corrode engine parts. Tap water with which they are mixed does have a corrosive effect, however. For

this reason most antifreezes contain a corrosion inhibitor which lasts during one season's use.

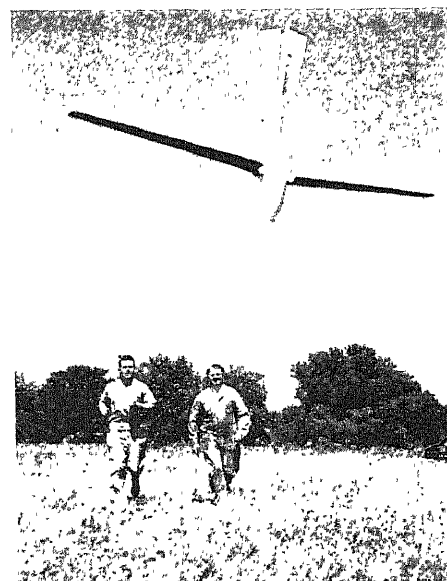
The alcohol—methyl, ethyl, and isopropyl—are largely alike in possessing low boiling points in comparison to water. They must be replaced from time to time, especially during mild weather.

Ethylene glycol and a newcomer, propylene glycol, boil at higher temperatures than water, and are therefore "permanent" anti-freezes, remaining in the radiator when the water boils off.

Harmful salt-base antifreezes have practically no fire hazard; the glycols are also considered safe in that respect. Simple alcohol and petroleum-base antifreezes may ignite in case of a spark reaching them, but, the scientists add, the problem of automobile fires is a secondary one.

The new Bureau of Standards Circular, Automotive Antifreezes, No. 474, can be obtained for 15 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Science News Letter, November 27, 1948



SUPERSONIC PARACHUTE—Expelled from V-2 rockets at altitudes up to 100 miles, the parachute, containing delicate research instruments, reaches supersonic speeds before its vanes spread out and gradually slow the device to about 27 miles per hour. I. B. Bensen, General Electric engineer and test pilot, inventor of the device, is pictured at the left.

AERONAUTICS

Device Lowers Instruments Safely from Rocket

➤ A SPINNING device resembling a giant dart which brings safely to the earth delicate instruments from a speeding rocket was revealed by General Electric. It is called a supersonic parachute, or rotochute, but it bears no resemblance to ordinary parachutes.

It has a bomb-shaped body, to hold the instruments, with a pair of rotator blades, a pointed nose, and a tail piece with fins. It is about four feet long and eight inches wide. The rotator blades, when open, extend about eight feet. It can carry a load of instruments weighing from 20 to 30 pounds.

The rotochute, with instruments enclosed, is carried to the upper atmosphere inside a rocket. At the peak of the rocket's flight, it is expelled. As it falls and the air becomes denser, its blades begin to revolve and are gradually forced into a horizontal position. This acts as a brake, and the device is slowed from supersonic speed to about 27 miles an hour.

Science News Letter, November 27, 1948

The Pacific coast has now one of the country's largest and fastest cold reduction steel mills; it can roll strip at a speed of 4,000 feet per minute.

PHYSICS

Neutretto Unnecessary

► THE NEUTRETTO is dead. Born of theory to explain a loss of mass when one kind of atomic particle changed into another, it is no longer needed as the result of new and more precise measurements reported to the National Academy of Sciences meeting in Berkeley, Calif.

Dr. Edwin M. McMillan of the University of California's Radiation Laboratory told how measurements of the masses of mesons created in the giant 184-inch Berkeley cyclotron explain how the positive heavy meson decays into a light one without assuming the existence of the now discarded theoretical neutretto (not to be confused with the neutrino).

The neutrino, although as yet undetected,

is still needed and scientists are convinced that it is real. Its neutrality and light weight, causing it to have extraordinary penetration, keep it from being found.

The meson masses determined by the team of Dr. Eugene Gardner and Dr. C. M. G. Lattes, who last March announced creation of artificial mesons in the Berkeley cyclotron, are: Heavy meson, 284 times electron mass, instead of 313; light meson, 215 instead of 212.

The hearts or nuclei of atoms are actually porous rather than opaque as previously believed, it is indicated by other cyclotron bombardment data reported by Dr. McMillan.

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from the Army studies will be made known promptly to the medical world.

The medical world, he said, must in turn contribute to keeping the Army healthy. Some sort of draft of doctors will have to be introduced if not enough volunteer to meet the Army's present need for 1,550 physicians plus 870 to replace those who will be lost from the service next spring when they complete their 24 months service under the Army Special Training Program. Expansion of the Army will increase further the number of physicians needed to keep our soldiers, Army civilian employees and their dependents healthy.

Science News Letter, November 27, 1948

SCIENCE NEWS LETTER

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MEDICINE

Operation Streptococci

► A VACCINE to protect against rheumatic fever, scarlet fever, septic sore throats and other diseases caused by streptococci is now being sought by Army medical scientists.

Their search is part of the all-out offensive against the streptococci announced by Maj. Gen. Raymond W. Bliss, Surgeon General of the Army, at the meeting of the American Public Health Association in Boston. Headquarters for this Operation Streptococci will be at Fort Francis E. Warren, an Air Force Technical Training Center in Wyoming.

The diseases caused by the streptococci could well be the health threat to the armed forces in the next war that malaria was in the last. It would be if the fighting is to be in parts of the world where the streptococci are as prevalent as malaria

germs are in the tropics.

Hope of developing a vaccine against the strep. germs seems to depend on finding a way of stepping up what scientists call the "anti-genicity of M substance." The "M substance" is an acid-soluble protein of the germ which calls up germ-fighting antibodies in the body.

Success of the Army's Operation Streptococci will mean better health for civilians as well as the armed forces. The rheumatic fever and strep-caused sore throats that plagued training camps in the last war are common and dangerous ailments of civilians also. Rheumatic fever, because of its effects on the heart, is one of the most crippling, one of the deadliest and one of the most prevalent diseases threatening the health of the American people today. Gen. Bliss stated that significant findings

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MEDICINE-ANTHROPOLOGY

Aleuts Aid Heart Study

Their freedom from heart disease has led scientists to study their diet in the hope that it may show the way to control of this condition.

➤ ALEUTIAN Island natives, familiar to American troops who served on remote outposts on the chain of islands between Alaska and Russia during the war, may show the way to a new dietary control of heart disease.

This possibility appears in the report of the Harvard University Expedition, which made a six-field study of Aleuts during this past summer.

The Aleuts enjoy almost complete freedom from heart disease, Dr. Fred Alexander, expedition doctor and heart specialist on the staff of Massachusetts General Hospital, found in his examination of 132 of the fewer than 1,000 natives now on the islands.

Because the Aleuts have always lived mainly on fish and meat, foods high in protein, the scientists wonder whether this type of diet may be partly responsible for the lack of heart disease.

The Aleuts' consistent fish-and-meat eating, changed only when the Russians brought in flour and sugar in the 18th century, is expected to prove helpful also in studying the effect of diet on teeth. During the 2,000 years before the arrival of the Russians, the Aleuts apparently had little or no tooth trouble, Dr. Coenraad Moorrees, of the Forsyth Dental Infirmary, Boston, reports.

Remains of "Lost" Race

Possible discovery of the existence of a "lost" race of North Americans may have been made, Dr. William S. Laughlin, Peabody Museum anthropologist and field director of the expedition, said. Skulls dating back some 2,000 years were found which indicated that Aleutian Islanders of that time were taller than the modern Aleuts found on the islands by the Russians only 200 years ago. The "lost" race was more like present Eskimos than the Aleuts.

Head measurements made on the modern Aleuts revealed one of the largest heads ever recorded. One Aleut had a cranial capacity of 2,000 cubic centimeters, compared with the 1,450-cubic-centimeter-capacity of average heads.

An excavation of 23 feet made by archaeologists Charles I. Shade of Harvard University and Alan G. May of Wenatchee, Wash., resulted in the discovery of the 2,000-year-old skulls. Theodore Banks of the University of Michigan also used the excavation to make a study of soil samples which may give a record of the effect of climate on vegetation over many centuries.

Other members of the expedition were: Dr. Gordon Marsh of the University of Nevada, who studied the language of the Aleuts, and Dr. Stanley Garn, research fellow at the Forsyth Dental Infirmary, who made a photographic record.

Under the direction of the Peabody Museum of Harvard University, the expedition was sponsored by the Viking Fund and the Office of Naval Research.

Science News Letter, November 27, 1948

BIOPHYSICS

Red Blood Cells Write Radioactive Signatures

➤ RED BLOOD cells have written their radioactive signatures on photographic film in Rochester, N. Y. The feat was accomplished by a medical research team at the University of Rochester, headed by Dr. George A. Boyd.

The researchers first incorporated radioactive carbon into one of the building-blocks of protein, the amino acid glycine.

They then injected this into the body of a rat.

Later, they took some of the rat's blood from the vein in its tail, and smeared a drop of this on photographic film, so thinly that individual red cells stood out by themselves. Radiations from these affected the sensitive emulsion like light rays, leaving microscopic dots when the film was developed.

Results of the experiment are described in the journal, SCIENCE (Nov. 12).

Science News Letter, November 27, 1948

GEOLOGY

Mississippi Grew Giants 75,000,000 Years Ago

➤ A PLACE in Mississippi where living things grew to gigantic size 75,000,000 years ago has been discovered.

Scientists who study the past life of this planet are used to dwarf or pygmy animals discovered as fossils, but Dr. Paul H. Dunn, geologist of Mississippi State College, told the Geological Society of America about ancient creatures that are five times or more the usually normal size.

A fossil known as a cephalopod was five feet in diameter whereas the usual fossil of this sort is only several inches. An oyster-like prehistoric creature, called a rudistid, was more than a foot and a half long compared with the normal few inches.

Science News Letter, November 27, 1948



NOVEL EXPERIMENT—In order to relate the electrical potential of the heart to the body weight in mammals, an electrocardiogram is made on a fur-seal pup in the Aleutians. Experimenters from left to right are: Dr. Fred Alexander, cardiologist from the Massachusetts General Hospital, Dr. William S. Laughlin of Harvard, and Karl Kenyon, biologist, U. S. Fish and Wildlife Service.

CHEMISTRY

Snatch Nitrogen from Air

➤ AMERICAN agriculture will benefit from a new method of thermal fixation of nitrogen from the air for fertilizer use which Dr. Frederick G. Cottrell was working on at the time of his sudden death.

With a group of scientists at the University of Wisconsin, Dr. Cottrell, famed for his method of electrical precipitation, was perfecting a way of snatching nitrogen out of the atmosphere without the use of large electrical power needed in the usual process which enabled the Germans to make explosives for fighting the first World War.

When a heart attack ended the career of this "scientist's scientist" attending the National Academy of Sciences meeting at Berkeley, Calif., where he was long professor of chemistry, Dr. Cottrell was discussing his new researches with his colleagues.

A fortune of millions of dollars was turned over to public use through the Research Corporation which he founded. His electrostatic method of precipitating smoke, chemical fumes and other particles

has cleared the air of industrial wastes and reclaimed valuable products. Cottrell precipitation played an important role in production of high test gasoline, carbon black and dozens of other important products for peace and war. His patents were given by him to the foundation many years ago and during the present year \$1,200,000 in grants are being given to promote research from earnings of the application of the process. (See SNL, June 21, 1947). Several professors in small and large universities are carrying on research under the Cottrell grants from the Research Corporation.

Dr. Cottrell was one of the rare scientists who remained scientifically active during his whole lifetime. Aged 71 when his latest researches were interrupted by death, his work on electrical precipitation was done when he was about 30. He had been director of the U. S. Bureau of Mines, head of the Fixed Nitrogen Research Laboratory, and consultant to many governmental and research organizations.

Science News Letter, November 27, 1948

ASTRONOMY

Jupiter's Moon Eclipses

➤ BEGINNING this month, eclipses of Callisto, second largest moon of the planet Jupiter, again are visible. During the next three years, with the aid of a small telescope, you will be able to see this satellite and its shadow move across the planet's disk.

When a satellite comes between Jupiter and the sun, its shadow is seen as a black dot making its way across the bright disk of the planet. The moon itself is usually much harder to spot, for frequently it is equally as bright as the planet.

Callisto has a much lower reflecting power, however, than the other three large satellites, also discovered in 1610 by Galileo Galilei, Italian astronomer and physicist. Thus not only its shadow but this moon itself can be spotted.

While the other three large satellites are eclipsed every time they circle around the planet, about half the time Callisto escapes an eclipse. This occurs when the plane of Jupiter's satellites, as seen from the earth, is at the greatest angle and the satellites are thus far apart. The relatively great distance of Callisto from Jupiter—1,167,000 miles—is largely responsible for the fact that at such times the satellite is not between the planet and the earth. Until a few days ago, there had been no transits of the satellite or its shadow, and no eclipses or occultations of it since August, 1945.

On Tuesday, Nov. 23, this satellite, which is 3,350 miles in diameter and thus much larger than our own moon and even bigger than the planet Mercury, was eclipsed just after sunset. This was not visible from the United States, however, but was seen by people in Central Europe and most of Africa, according to calculations made at the Nautical Almanac Office of the U. S. Naval Observatory.

On Feb. 15, the beginning of an eclipse of Callisto will be visible just before sunrise in the eastern part of the North American continent. The sun will have risen, however, before the eclipse ends several hours later so this will not be seen. Complete eclipses of Callisto may be seen with only a small telescope, however, a number of times during the next three years.

Science News Letter, November 27, 1948

PLANT PATHOLOGY

Streptomycin By-Product Kills Plant-Disease Fungi

➤ THE SAME fungus that produces streptomycin, deadly to many germs that afflict man, also produces another substance even more deadly to some of the fungi that cause plant diseases. The new antibiotic has been given the name actidione by its discoverer, Dr. Alma Whiffen, re-

search worker on the staff of the Upjohn Company in Kalamazoo, Mich.

At the time of her discovery, Dr. Whiffen was actually seeking an antibiotic that could be used to treat fungus-caused diseases in man, of which athlete's foot is perhaps the commonest example. She isolated this new substance from culture fluid in which *Streptomyces griseus*, source of streptomycin, had been growing. Used against these disease-causing fungi in laboratory vessels, it at first looked promising; but later experiments on actual cases proved disappointing.

In the meantime, the new substance was being tested for its effects on plants, under the screening program of the National Research Council. In the greenhouses of Michigan State College at East Lansing, Drs. Irma M. Felber and C. L. Hamner found that too high a concentration (100 parts per million in water) would injure or kill the oat and bean seedlings used as experimental plants.

When much lower concentrations were tried, however, the effect was radically different. In concentrations from ten down to one parts per million, actidione wiped out, in as little as 48 hours, infections of powdery mildew, one of the most destructive and hard-to-fight of plant diseases, on the leaves of beans, tomato plants and rose bushes, without harming the plants themselves.

Further experiments are now in progress, to discover what other plant-disease fungi it will prevent or kill, in what concentrations it is most effective, and what "spreader" chemicals should be added to the spray or aerosol solutions in which it is used.

Science News Letter, November 27, 1948

PSYCHOLOGY

Thought Waves Show Up On Brain Wave Record

➤ A BRAIN WAVE that seems to be really a thought wave has been discovered by four psychologists at Tufts College in Medford, Mass. The four are John L. Kennedy, Robert M. Gottsdanker, John C. Armington and Florence E. Gray.

The thought waves, called "kappa waves" by the psychologists, show up on the brain wave record when a person is doing mental arithmetic, trying to tell which of two tones is longer, learning nonsense syllables, naming the 48 states from memory and solving problems.

They even show up occasionally when a person is trying not to think, probably corresponding to the thoughts that come when trying to keep the mind a blank. Talking, aloud or to oneself, is not associated with the new thought waves. Nor are they produced by such non-thinking brain activity as merely hearing a sound or making the response of pressing a key at a signal.

The new thought waves are recorded in the same way as other brain waves but the

electrodes for picking up thought waves are placed just back of the outer edge of the slits between the eyelids. This position suggests, the scientists point out in their report in the journal, *SCIENCE* (Nov. 12), that the source of the thought waves may be the temporal lobes of the brain.

Science News Letter, November 27, 1948

ORDNANCE

Soviet Tanks Lack Finish But Are Termed Efficient

➤ RUSSIAN TANKS are rough-looking, but first class fighting machines, declares Col. Robert J. Icks, an Ordnance Reserve officer, in the technical journal, *ORDNANCE* (Nov.-Dec.). They have thick armor and good guns, and can dish it out as well as take it.

Commenting on their apparent lack of finish, a Russian once remarked to Col. Icks, "To us a tank is built to last for only three shots. One you may get off and may miss, the second the enemy gets off and may miss, and third either one of you hits. It had better be you that hits him because he isn't going to miss the next time."

Tank designers of the USSR, Col. Icks points out, are able to take advantage of information contributed by lend-lease and captured enemy materiel, as well as by their espionage service. In addition, they have many captured and conscripted German tank experts working for them.

In the meantime, the Army has announced the unveiling of the new Patton tank, which took place at the Detroit Arsenal on Armistice Day, with the widow of the famous tank commander of World War II doing the christening.

The Patton tank resembles the present medium M26, but has a speed of 30 miles an hour instead of 20 and it carries as principal weapon a 90-millimeter gun. A waterproof electric system will enable it to ford deep streams, and it can be "winterized" to operate at temperatures as low as 65 degrees below zero Fahrenheit.

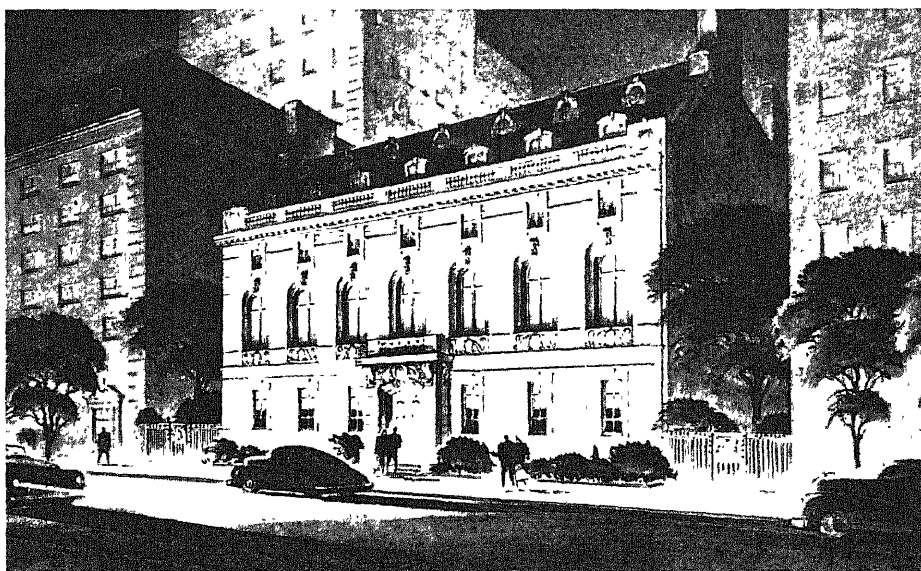
Science News Letter, November 27, 1948

MEDICINE

Chloromycetin May Conquer Cholera and Dysentery

➤ DYSENTERY, cholera, and two relatively new diseases, Q fever and rickettsialpox, are the next diseases expected to fall before the healing power of chloromycetin, streptomycin-like remedy dug out of a sample of earth from Venezuela. These prospects were disclosed by Army scientists at the meeting of the American Public Health Association in Boston. The recently crystallized drug has already shown rapidly curative effects in five other plagues, epidemic typhus, scrub typhus, murine typhus, typhoid fever and Rocky Mountain spotted fever.

Science News Letter, November 27, 1948



MR. N. Y. SCIENTIST'S DREAM HOUSE—The architect's conception of building in which the New York Academy of Sciences hopes to house its numerous activities is shown here. A \$1,000,000 drive is underway to purchase and maintain new quarters. Fourth oldest scientific society in America, the Academy was founded in New York City in 1817. It now lists more than 4,000 members.

AERONAUTICS

Foresee Automatic Flying

In 15 years airplanes will be equipped with all-weather flying aids, radar, television and other devices which will permit automatic flight, expert predicts.

➤ COMPLETELY automatic, weather-proof flying will be possible through use of present flying aids, plus radar, television, electronic computing machines and un-built devices for the future—and we'll have it in 15 years.

That's what Howard K. Morgan, vice-chairman of the Radio Technical Commission of Aeronautics, foresaw in connection with the demonstrations of the best there is today in aviation traffic control and navigation.

Devices for greater automatic flight safety recommended by the RTCA were shown at the Wier Cook Airport, Indianapolis, Ind., where the Civil Aeronautics Administration all-weather flying aids are installed.

Already the big airlines are expected to be equipped with the new all-weather devices in the near future. Mr. Morgan, who is assistant research director for Bendix Aviation Corporation Radio Division, pointed out that by 1963 the longer range "ultimate common system" outlined by RTCA is expected to be completed.

The list of devices that will bring aviation closer to automatic flight will include: very high frequency omni-directional range

stations, operating on static-free radio waves which will provide very many flying courses radiating like the spokes of a wheel; and stations and measuring equipment linked with an automatic computer which will enable a plane to take a straight course past several ranges. Distance-measuring equipment, a link in the omni-range system, provides aircraft continuously with measurement of distance to stations.

Very important is an instrument landing system to make an electronic pathway to the runway. This will enable a pilot to make a safe landing when ceiling and visibility are below present minimums. The devices include beam radar to watch the fixed beam approach, giving a double check on the electronic pathway down to the runway.

Additional devices are improved runway- and approach-lighting to guide the final approach, also radar instruments to spot planes in the air, and to let them know by radio how many other planes are aloft and where they are. This automatic system will use devices already in existence and many which are now known to be possible but are not yet developed.

Science News Letter, November 27, 1948

CHEMISTRY

Big Lead Chloride Crystal Grown by Army Chemists

➤ ARMY CHEMISTS claim to have produced the biggest lead chloride crystal ever grown by man. It is over an inch and a third long and nearly an inch thick. It was prepared in a furnace used for growing rare crystals for high-precision equipment.

Small lead chloride crystals are common. In ordinary laboratory experiments they are made by cooling a hot-water saturated solution of lead chloride. This chemical compound is readily soluble in hot but not in cold water. When the hot-water solution cools, shining crystals are deposited.

The large crystal grown was produced by Dr. Joseph M. Ashcroft and Dr. A. Smakula, both Engineer Corps chemists at Fort Belvoir, Va. In the process a melt of purified commercial lead chloride crystals was lowered in a glass crucible through increasing temperatures by slow degrees, at a rate of less than half an inch a day. This was found necessary in order to produce a single crystal instead of a crystalline mass of small ones.

Science News Letter, November 27, 1948

AERONAUTICS

No Atomic-Powered Planes Seen For Next Few Years

➤ DON'T EXPECT any atomic-powered planes in the next few years, "even if further work does indicate that it is feasible," Dr. Robert F. Bacher of the U. S. Atomic Energy Commission cautioned the Washington Academy of Sciences.

Denying a published statement that 99% of the theoretical work for such was completed, the scientist-member of the Commission conceded that the main problems are technical and engineering, not scientific. But, he pointed out, the B-29 bomber took as long from design to production as did the atomic bomb.

Science News Letter, November 27, 1948

PUBLIC HEALTH

1948 Sets Record Low for Deaths from Many Diseases

➤ A RECORD LOW mortality with new low death records for influenza, pneumonia, tuberculosis, syphilis, appendicitis and diseases of childbirth is predicted for 1948 on the basis of figures through the first nine months of the year.

The healthy-year prediction comes from statisticians of the Metropolitan Life Insurance Company based on experience among the company's industrial policyholders.

The year has been particularly healthy for

white women and girls, the mortality figures show.

Three out of the four principal "catching" diseases of childhood, scarlet fever, whooping cough and diphtheria, show minimal death records. The death rate for measles is up, because this has been a measles year with about three times as many cases as last year.

Cancer, the principal chronic diseases of heart, kidneys and blood vessels, and infantile paralysis show higher death rates than for last year.

The homicide rate remained the same as in 1947 but the rates for suicides and all forms of accidents are down.

Science News Letter, November 27, 1948

GENERAL SCIENCE

Wartime Typhus Conqueror Awarded Gorgas Medal

➤ HAILED as a conquering hero of one of man's dread wartime enemies—typhus—Brig. Gen. Edgar Erskine Hume received the Gorgas Award at the annual dinner of the Association of Military Surgeons in San Antonio, Texas.

The presentation of the medal and \$500 cash award was made by Everett V. Scott, executive of Wyeth Incorporated, biological and pharmaceutical house. General Hume was cited as the man who first used DDT on a mass scale to check the typhus epidemic raging in Naples, thus protecting our GIs and millions of Italians.

Science News Letter, November 27, 1948

GENERAL SCIENCE

Japan's Scientists Will Elect Science Council

➤ WHEN 40,000 Japanese scientists on Dec. 20 elect 210 members of the country's first national science council, it will be the first attempt of any country to elect by scientific vote the members of its ranking science organization.

Five American scientists selected by the National Academy of Sciences will arrive in Japan late in November to consult with Japanese scientists in the development of that country's new "Democratic National Organizations for Scientific Activity."

The mission is headed by Dr. Detlev W. Bronk, president-elect of Johns Hopkins University, and other members are Drs. E. C. Stakman, University of Minnesota plant pathologist, Dr. Zay Jeffries, General Electric vice-president, Dr. I. I. Rabi, Columbia University Nobelist, and Dr. Roger Adams, University of Illinois chemist.

The top science bodies of other nations, such as the National Academy in the U. S. A. and the Royal Society in London, elect members by vote of the existing membership, not by franchise of the population of scientists.

Science News Letter, November 27, 1948



AERONAUTICS

Carrier-Based Jet-Fighter Successfully Tested

See Front Cover

➤ A TYPE of flying wing jet-fighter for shipboard operation has completed initial flight tests at the Naval Air Test Center, Patuxent River, Md. It is a tailless craft, but differs from the true flying wing in that it has a fuselage much like the familiar one on ordinary airplanes.

It has, however, the broad swept-back wings of the flying wing type which are known to be desirable in high-speed planes, as shown on the cover of this week's SCIENCE NEWS LETTER. This new plane, with two jet engines, is rated as capable of over 600 miles an hour. This means that it is potentially capable of speeds in excess of current models of operational jets, land or carrier-based.

The new plane is a product of Chance Vought Aircraft, Stratford, Conn., and will be known as the Navy XF7U-1. The unconventional appearing plane has two vertical stabilizers and rudders at the trailing edge of the wing. Longitudinal and lateral control are obtained through the use of a pair of "ailerons" which are combined ailerons and elevators.

Power plants of the new plane are two Westinghouse turbo jets. For combat performance, high bursts of speed may be obtained through after-burners. These, on the jet exhausts, give additional combustion and thrust. The air intake ducts are at the roots in the leading edge of the wings.

Science News Letter, November 27, 1948

PHYSICS

New Low Figure Set For Mesotron Mass

➤ A NEW bantamweight among atomic particles, that appears to have only ten times the mass of an electron, wrote its autograph on a photo-negative in the physics laboratory of the California Institute of Technology. Photograph and deductions based on it by Dr. E. W. Cowan appear in the journal SCIENCE (Nov. 12).

What the photograph actually shows are the vapor trails left by an electron and this hitherto unknown particle as they collided and violently changed courses. From what happened to the known electron Dr. Cowan calculated that the unknown stranger it ran into was a mesotron (or meson) having about ten times its mass.

Science News Letter, November 27, 1948

THE FIELDS

MEDICINE

New Drug Shows Promise Of Relieving Muscle Spasm

➤ A DRUG even better than myanesin for relieving the muscle spasms of cerebral palsy, infantile paralysis and perhaps other conditions may be on the way. First reports of this drug, developed by Dr. F. M. Berger, University of Rochester scientist who discovered myanesin, appear in the journal, *SCIENCE* (Nov. 19).

Reporting the new drug with Dr. Berger are Drs. V. Boeckelheide and D. S. Tarbell of the university.

The drug is one of a series of newly synthesized compounds known as dioxolanes. So far they have been tested only on laboratory animals. Trials on human patients will not be made for some months to come.

Among the new drugs are some with greater activity and a greater margin of safety than myanesin.

Science News Letter, November 27, 1948

ENGINEERING

Ship's Course Recorded By New Electrical Device

➤ A "SHIP steering recorder," which automatically and continuously records a ship's course, has been developed by engineers of the General Electric Company.

The new instrument marks the ship's rudder position and compass direction on a 12-inch moving roll of waxed paper, passing beneath metal points which are connected electrically with the ship's rudder and compass. The recorder calculates any deviation from the set course on the moving paper. Engineers claim that the device will detect an error in course as slight as two-tenths of a degree.

Several of the recorders are now being used experimentally by the U. S. Navy in destroyer and submarine chart rooms. No permanent installations of the equipment have been made as yet.

Science News Letter, November 27, 1948

PSYCHOLOGY

Human Beings Are Dogs In Dogs' Estimation

➤ YOU ARE a dog. At least, that's what you are in your dog's estimation.

Stated more formally: "Behavior patterns which dogs exhibit toward people are similar to those exhibited toward dogs." This is one of the conclusions reached in a

comparative study of the social behavior of dogs and wolves by Dr. J. P. Scott of the Roscoe B. Jackson Memorial Laboratory at Bar Harbor, Maine.

Other conclusions are that social organization among both animal groups is largely connected with the food supply, and that there are almost no behavior patterns in dogs which are not also seen in wolves. However, in the domesticated dogs certain traits have been suppressed, others exaggerated, as the result of selection.

Wolves are relatively easy to domesticate, Dr. Scott stated, partly because they are by nature social animals and partly because their long puppyhood makes them dependent on help from their parents. A human foster-parent, fitting himself into this dependency pattern, has plenty of time to gain the young wolf's confidence and become accepted as just another wolf.

Dr. Scott presented the results of his researches before a special conference on methodology and techniques for the study of animal societies in New York.

Science News Letter, November 27, 1948

GEOLOGY

Atom-Powered Blisters Made Mountain Systems

➤ ATOMIC ENERGY, working slowly through millions of years instead of in a flash as in the man-made atom bomb, makes mountain systems by bulging the earth's crust up into immense blisters, which then collapse and let the heated rock beneath escape as magma or lava.

This "blister" hypothesis of mountain origin was presented before the meeting of the Geological Society of America in New York by Dr. C. W. Wolfe of Boston University.

A rough model of what happens can be seen in any pan of cooking breakfast cereal as it gets stiff and thick, except that the big, blister-like bubbles that swell up, burst and collapse are filled merely with steam instead of potentially liquid rock.

Heat, largely from atomic disintegration, accumulates in a zone not more than 50 miles deep below the earth's surface. This causes the overlying crust to bulge up into the blister, Dr. Wolfe stated. Around the margin of the blister a trough-like depression develops, technically known as a geosyncline. This is a zone of weakness, and the escape of the magma may take place either here or through the weakening, domed top of the blister itself.

Among other geologic phenomena which could be explained on the basis of the blister hypothesis, the speaker suggested, are changes in sea level, which have long been a sore puzzle to students of earth history. Formation of suboceanic blisters would account for a rhythmic rise and fall in sea level.

Science News Letter, November 27, 1948

ARCHAEOLOGY

California Inhabited by Humans During Ice Age

➤ WHEN ICE gripped the earth about 50,000 years ago, California was inhabited by some sort of human beings.

The remains of fires, tools and discarded shells of many ancient dinners have been found in shore deposits near what is now La Jolla, the Geological Society of America was told in New York by Dr. George F. Carter, geologist of Johns Hopkins University, Baltimore, Md.

When these La Jolla men lived the sea level was lower than now and now the ocean is rapidly eroding the buried evidence of these very early Californians whose skeletons have not been discovered.

Science News Letter, November 27, 1948

ENGINEERING

Automatic Dispatching Controls Elevator System

➤ RAPID SERVICE at timed intervals, due to automatic dispatching, features the "elevator of tomorrow" revealed in New York by the Otis Elevator Company. It is a system for a bank of elevators in a large business building in which regulated up-and-down service is provided by controls activated by electronic devices.

There are six traffic patterns experienced daily in most busy buildings: morning, noon and evening rush periods with heavy traffic either up or down, in-between two-way traffic periods, and night and holiday service. Two dials on the starter's panel can be set to meet these patterns.

One is a traffic-flow dial, with six positions to meet the six traffic patterns. The other is a dispatching-interval dial which can be set to dispatch elevators at regular intervals to handle most efficiently the traffic in the pattern period. The system has been dubbed "autotronic elevating" because dispatching, car spacing and passenger waiting time are controlled automatically and electronically. All manual adjustments are taken out of the hands of the starter.

The system offers particular advantage during rush-hour down-traffic at the end of a day for passengers on lower floors for whom elevators fail to stop because already loaded at higher floors. During this period, passenger-waiting time is automatically measured by electric condensers. If the voltage of a single condenser builds up to a pre-determined point, it activates an electronic tube which operates controls to cause an up-elevator to stop at the floor to take the passenger down. What actually happens is that some cars become diverted to pick up passengers in the low zones while others serve the higher floors. When the calls drop off, the system automatically readjusts itself to normal.

Science News Letter, November 27, 1948

ASTRONOMY

Bright Stars of Winter

The most brilliant stars of evening can be seen in December. Brightest of all is Sirius, the dog star, shining low in the southeast.

By JAMES STOKLEY

➤ THE MONTH of December brings us, on the 21st at 5:34 p.m., EST, the beginning of winter, for then the sun, which has been moving southward in the sky since last June, reaches its southernmost point, called the winter solstice. This, of course, is true only in the northern hemisphere, for south of the equator summer begins at the same time.

But besides winter, December brings us a view of our most brilliant stars of evening. Low in the southeast shines Sirius, the dog star, the brightest of all. Its position is indicated on the accompanying maps, which show the appearance of the skies at 10:00 p.m., your own kind of standard time, at the beginning of the month and an hour earlier around the 15th.

Sirius is in Canis Major, the great dog, one of two such animals among the constellation figures. The other is Canis Minor, the lesser dog, which is seen almost directly east, and a little higher. But above these two figures there can be seen one of the most familiar of all star groups—Orion, the giant warrior. He is typified by the three stars of similar brightness in a row which form his belt. To the left of the belt and a little higher is Betelgeuse, and on the other side is Rigel. Both of these are classed as of the first stellar magnitude in brightness. Orion, incidentally, is the only constellation visible from these northern latitudes which contains two first magnitude stars. The only other of which this is true is Centaurus, the Centaur, which is seen from more southerly latitudes.

The Twins

In the east, directly above Canis Minor, we find Gemini, the twins. Pollux, lower of the two brightest stars, is first magnitude, but his brother Castor, is not. Passing above Orion, we come to Taurus, the bull, with brilliant Aldebaran. Still higher, in the east above Gemini, is Auriga, the charioteer, with Capella, which is brighter still.

The only other first magnitude stars shown in the December maps are low in the northwest, where their splendor is somewhat dimmed. One is Vega, of Lyra, the lyre, shown close to the horizon, while the other is the nearby Deneb, in Cygnus, the swan.

Among somewhat fainter constellations now in good position we have Perseus,

the champion, directly overhead. In this is Algol, the "demon," a famous variable star. It consists of two separate globes, revolving around their center of gravity. One is much brighter than the other, but every two days, 21 hours, the darker orb comes in front of it, and makes it appear fainter. Such a pair is called an "eclipsing variable." Some other stars are truly variable, that is, there is an actual change of the amount of light which they emit.

Though no planet appears on the maps, Saturn, about as bright as Betelgeuse, appears a little later in the evening in the east in the constellation of Leo, the lion. Venus, many times as brilliant, rises in the east shortly before the sun. At sunrise it stands about 20 degrees above the southern horizon. Mercury, Mars and Jupiter are all too nearly in the same direction as the sun to be observed. In the constellation of Gemini is the planet Uranus, but even though it is closest on December 20, it still requires some optical aid to reveal its presence.

Full Moon

The night of Dec. 15-16 brings the full moon of December. As it rises that night in the east just as the sun goes down in the west, many people will see it—and wonder why it looks so big. This apparent enlargement of the moon near the horizon, which also occurs with other celestial bodies, is one of the most familiar of sky-effects, and also one of the least understood.

One of the most common explanations ascribes it to the fact that when the moon is near the horizon we compare it with

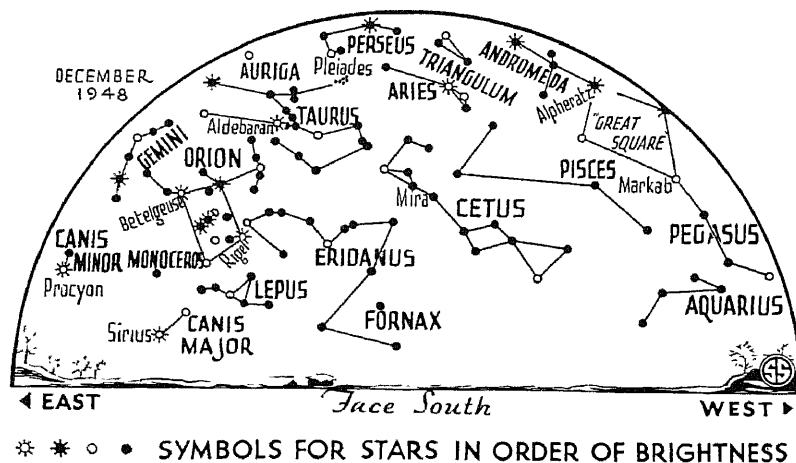
terrestrial objects such as houses or trees. However, no one has ever been able to explain why such a comparison should make it look big, rather than small, and furthermore, the effect is observed with the moon rising at sea. Then there is a perfectly plain horizon with no objects for comparison.

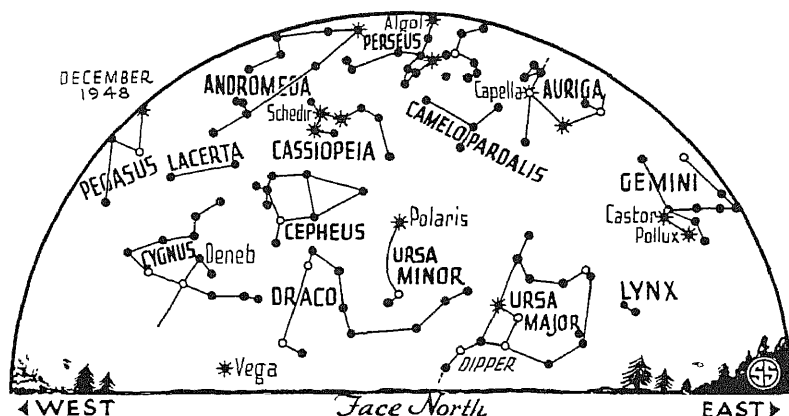
Explore Illusion

Some of the most exhaustive of recent researches to determine the cause of this illusion have been made by a Harvard psychologist, Dr. Edwin G. Boring, in collaboration with A. H. Holway, L. M. Hurvich and D. W. Taylor. They made careful experiments indoors and out, with artificial moons as well as the real thing, looking at it directly and in mirrors, etc. Several papers have appeared in scientific journals reporting their results, and these have been clearly summarized by Dr. Boring. Writing in a chapter in *FOUNDATIONS OF PSYCHOLOGY* (John Wiley and Sons, 1948), which he edited with Dr. Herbert S. Langfeld of Princeton and Dr. Harry P. Weld of Cornell, he uses this as an example of the scientific use of hypothesis. He says:

"When an hypothesis is verified, you are very likely to find that it sets up new problems. So now you think up new finer hypotheses to direct you toward finding out why the hypothesis just verified is true, and that process of refinement can go on practically forever.

"This study of the moon illusion shows this process operating. It was early observed that the moon looks larger on the horizon than up in the heavens. Many hypotheses were advanced—that the difference is due to refraction at the horizon, or due to the atmospheric haze at the horizon, or due to the fact that the moon looks farther away at the horizon and thus would have





to be big in order to give the normal-sized image on the retina.

"The first two hypotheses fail when tested by the camera. A photograph of the horizon moon is as small as the photograph of the moon in elevation. The third hypothesis fails because the horizon moon no longer looks large when you bend over and view it between your legs. The next hypothesis is that the illusion depends on looking up, and that hypothesis has been proved. It holds even for experimental moons only 30 meters away.

"So now you know; the phenomenon is an illusion and not an astronomical change, and it depends on looking up. But why, you ask at once. That needs another hypothesis. Perhaps what shrinks the moon is raising the eyes, or perhaps it is bending the neck. That question has been answered. The raised-eyes hypothesis is right, the bent-neck hypothesis is wrong. So, by forming and testing new hypotheses, you have refined your knowledge.

"Now you want to know why raising the eyes shrinks the moon, but no one has yet been clever enough to formulate for test the crucial hypothesis that will answer that question. Sometime it will be done."

Time Table for December

Dec. EST

- | | | |
|---|-------------|---------------------------------------|
| 1 | 10:27 p. m. | Algol at minimum |
| 4 | 7:16 p. m. | Algol at minimum |
| 8 | 6:00 a. m. | Moon farthest, distance 251,200 miles |
| | 8:57 a. m. | Moon in first quarter |

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MANUAL 25c

- | | | |
|----|-------------|---|
| 12 | early a. m. | Meteors of Geminid shower visible |
| 16 | 4:11 a. m. | Full moon |
| 20 | 7:00 a. m. | Uranus nearest distance 1,675,000,000 miles |
| | 12:00 noon | Moon nearest, distance, 229,100 miles |
| 21 | 3:51 a. m. | Moon passes Saturn |
| | 5:34 p. m. | Sun farthest south, winter commences in northern hemisphere |
| 22 | 12:11 a. m. | Algol at minimum |
| 23 | 12:12 a. m. | Moon in last quarter |
| 24 | 9:00 p. m. | Algol at minimum |
| 27 | 5:49 p. m. | Algol at minimum |
| 28 | 1:20 a. m. | Moon passes Venus |
| 30 | 4:44 a. m. | New Moon |

Subtract one hour for CT, two hours for MT, and three for PT.

Science News Letter, November 27, 1948

PLANT PATHOLOGY

Uranium Found To Cause Hereditary Changes

➤ URANIUM, the atom-bomb element, is able to cause hereditary changes in plants when supplied in the form of its nitrate salt. Experiments demonstrating such changes in two widely different kinds of fungi are described in *SCIENCE* (Nov. 19), by Dr. E. C. Stakman, professor of plant pathology at the University of Minnesota and president-elect of the American Association for the Advancement of Science, together with Drs. J. M. Daly, M. L. Gattani and I. Wahl.

When supplied to the spawn of ordinary mushrooms, it produced mutants that grew from five to seven times faster than the original mushroom strains from which they were derived. Another fungus on which the uranium compound wrought hereditary changes was the one that causes smut disease in corn.

Dr. Stakman feels that these same effects may be obtained in other plants and perhaps animals. The uranium used in these experiments was of the ordinary kind, not the highly radioactive U236. The culture medium containing it is described as "mildly radioactive".

Science News Letter, November 27, 1948

"The whole world is queer except thee and me, and sometimes even thee seems a little queer"

HANDBOOK OF PSYCHIATRY

by Winfred Overholser, A.B., M.D., Sc.D.
and Winifred V. Richmond, B.S., A.M., Ph.D.

It is the authors' belief that much of the layman's dread of mental abnormalities comes from ignorance of the psychiatric disorders and their treatment, and the way must be prepared for the understanding of the problems of prevention and therapy.

To such clarification this book is aimed, and the following subjects are discussed: the difference between psychology and psychiatry, the development of psychiatry and psychoanalysis, the role of psychiatry in daily life, and various mental illnesses and their treatment.

The reviewers have said of this book: "... it would probably be difficult to find a more admirable 'first reader' in psychiatry;" "... a sensible and authoritative discussion of the modern concepts of psychiatry... well documented, simply worded, and carefully prepared;" "... understandable to the laity and also informative to the expert."

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RADIO

FM for Local Schools

➤ **SCHOOL** and college use of FM radio transmitters, in so-called educational stations for which the Federal Communications Commission has set aside special wavelengths, gives promise of rapid development with new, inexpensive equipment now available.

FM stands for frequency modulation, the type of static-free radio transmission coming widely into use. It is "line-of-sight" transmission, which does not follow the curvature of the earth and is available ordinarily only to receivers within some 50 miles of the sending station. The new transmitters proposed for use in the educational program would have power enough to carry only from some five to 15 miles.

One of these new FM transmitters is a General Electric product. It furnishes ten watts of power in the 88-108 megacycle frequency range, where its signals may be received on standard FM receivers. Its coverage is from five to 10 miles. It is suitable for church and community programs as well as for educational stations.

Another transmitter is a product of Radio Engineering Laboratories, Long Island City, N. Y., and is called a Serrasoid Modulator. Its first showing was at a recent FM convention in Chicago. It is de-

scribed as holding promise of bringing FM programs within reach of many communities and groups now denied radio facilities because of high cost.

This transmitter is said to have high-fidelity on low power. Its local area can be well defined and scores of local stations could therefore use the same wavelength over the country without interference. The new system thus reinforces FM's potentiality of providing America with thousands of radio stations compared with the limited number of overlapping and expensive AM stations now in use. AM, amplitude modulation, is the type of radio transmission employed in the familiar long-used radio systems.

Science News Letter, November 27, 1948

ENGINEERING

Weather Stations Use Wind-Driven Generators

➤ **NEXT THERE** will be an automatic weather-reporting station needing no attention for a year at a time. An apparatus that utilizes the wind for power is under development in the Army Signal Corps laboratory, Fort Monmouth, N. J. It is de-

signed for use in out-of-the-way places, such as north of the Arctic Circle.

Automatic weather stations are now in use in various parts of the world. They send out by radio signals information on temperature, humidity, wind velocity and direction, and other data hourly or at other intervals. The power to create the energy for their radio signals is provided by a gasoline-driven generator which is started and stopped by a clock. Electrical energy keeps the clock wound. These stations need a new supply of gasoline about once a month. Once they utilize wind-power, little attention will be needed.

The wind in these new weather-reporting stations will drive an electrical generator to charge a bank of storage batteries. The batteries, in turn, will operate the radio and other equipment. A wind of seven miles per hour will generate electricity in the type of equipment to be used, and one of 24 miles per hour will produce the generator's rated output of 2.5 kilowatts. An automatic regulator will prevent over-charging of batteries.

The windmill is not the familiar long-armed type, but a three-bladed propeller. It will be mounted on a tower, the height of which will depend upon the intensity of winds at any particular installation. The wind propeller was developed by scientists of the Signal Corps and the Wind Turbine Company of West Chester, Pa.

Science News Letter, November 27, 1948

ENTOMOLOGY

DDT-Resistant Fly Strains Take 50 Times Normal Dose

➤ **DDT**, used freely to kill off flies, provokingly continues to act as an agent of quasi-natural selection, producing strains that represent the survival of the toughest. Dr. James R. Douglas, entomologist at the University of California's College of Agriculture in Davis, Calif., reports finding flies that require 50 times the normal dose of DDT to kill them. There was nothing wrong with the DDT, for it readily killed non-resistant strains of laboratory-reared flies.

Science News Letter, November 27, 1948

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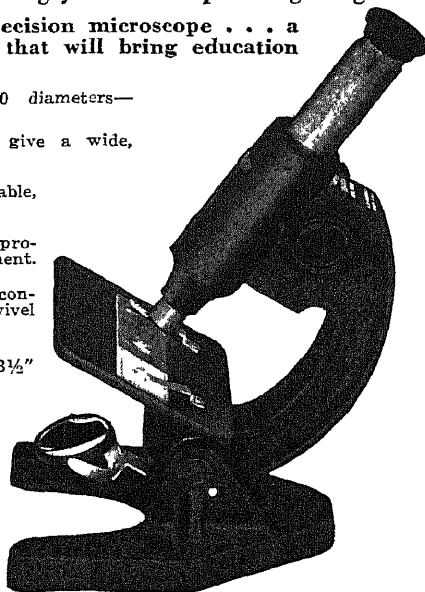
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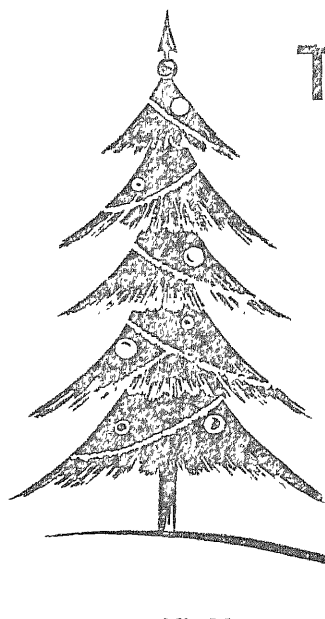
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Three Christmas Gift Ideas for EAGER- MINDED CHILDREN

Kit No. 1

FUNDamentals of Science MAGNETISM AND ELECTRICITY

Equipment and instructions for 56 experiments on magnetism (making a compass for instance), static electricity, the electrophorus, the electroscope, making a condenser, electric currents, making a galvanometer, and electroplating are contained in this kit.

Specifically, the equipment consists of: MAGNETISM—Horseshoe-type Magnet, Package of Iron Filings, Compass Card, Lodestone. STATIC ELECTRICITY—Sealing Wax, Metal Foil, Pyrex Test Tube, Fur, Cornstalk, Gold Leaf, Metal Disk and Sheet of Acetate Film for Electrophorus. CURRENT ELECTRICITY—Zinc Strip, Coil of Insulated Copper Wire, Carbon Rod, Sal Ammoniac. ONE PARTS BOX CONTAINING—a compass bearing, steel needles, steel pins for compass, gummed strips, soft iron nail, cork disks, ball bearings, straw, ball and pin for electroscope.

Kit No. 2

FUNDamentals of Science BLACK LIGHT AND GLOWING MATERIALS

26 experiments on fluorescence, phosphorescence, and glowing paints are suggested in the instructions for this kit, along with how to use fluorescent material in crime detection and how to get stroboscopic effects.

Specifically, the equipment consists of: SIX MINERAL SPECIMENS—Wernerite, Semiopal, Autunite, Green Fluorite, Willemite, Brown Fluorite.

SEVEN VIALS OF GLOWING MATERIALS: Fluorescent—Deep Yellow, Blue-Green, Cerise, Light Yellow; Phosphorescent—Light Green, Gray-white; Special—Greenish Gray-tan. One Vial of Gum Arabic, AND A fluorescent golf tee, a brush, a star map, a stroboscope, a picture (for coloring). One 110-Volt Argon Lamp—Rich in ultra-violet.

Kit No. 3

FUNDamentals of Science SOILLESS GARDENING

This kit has the instructions and the equipment for a soilless garden in the house or in an apartment without regard to weather. How to plant seeds, how to water and feed them, how to transplant, about water culture, sand culture, soilless gardening on gravel or cinders, about deficiency symptoms, about seedless fruit hormone, and how to produce seedless tomatoes, and how Hormodin is used—all this knowledge is in the Soilless Gardening Kit.

There are suggested experiments with sprouting seeds, and how to speed germination; on the importance of chemicals and how plant roots produce acid; about phototropism and geotropism; how to grow carrots upside down; how to perform tricks with plants (changing the length of day) and what total darkness does to plants; what light versus gravity does, colored light, and the use of colored tents.

Specifically the equipment consists of: One dozen green POTS (that you can assemble); COLORED CELLOPHANE sheets to be used in light and growth experiments; CHEMICALS your plants will need—potassium acid phosphate, magnesium sulfate, calcium nitrate, ferrous sulfate; Seven kinds of SEEDS—Russian sunflower, Earliana tomato, Globe radish, Dwarf nasturtium, Okra, Soya bean, Ornamental gourds; Box of VERMICULITE; Plant Breeding Material—HORMODIN, SEEDLESS FRUIT HORMONE.

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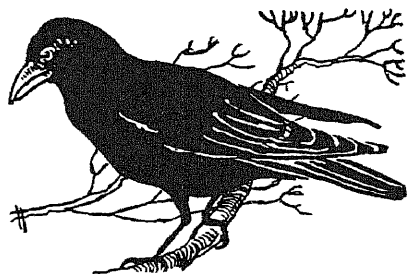
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Fill in the coupon at the left, detach and mail today, indicating whether you wish the kits sent direct to your favorite mentally energetic child, or to yourself.



South for the Winter

➤ USUALLY, when we talk of birds going south for the winter, we think of their leaving northern lands that will soon be frostbound and seeking warm, sunny regions until spring shall send them north again. This is the migration of bluebird and oriole, of duck and goose; the pattern

is so prevalent that we are prone to think of it as exclusive.

Yet birds are all about, in winter; even the least observant of us sees and hears them. Their presence is apt to be explained by an easy, "Oh, they stick around the whole year."

This is by no means necessarily the case, and of some birds it is not true at all. Whole populations of birds that are seen in the northern states during the snowy season disappear or become pretty scarce in summer; nuthatch and brown creeper, for example, and that mighty hunter of mice, the great horned owl. Most such birds nest in Canada, though in some species the summer breeding range does extend down into the United States a little.

In some cases, too, we apply the permanent-resident explanation to a bird species because we see representatives around practically all the time, and assume they are the same individuals. However, what we are likely to have is an overlapping of two migrant populations that do not go very far. Crows that we see in summer are very apt to flap southward a few hundreds, or perhaps only a few scores, of miles to their winter range. In the meantime their place in our landscape is taken by other crows from a little farther north. And since all crows look alike to us, we assume that no migration at all has taken place.

The European starling, a recently introduced species that has become a spreading pest, has developed this limited and overlapping migration to a marked degree. The starling flocks that are wholly undesired feature of downtown Washington, D. C., in winter are migrants from western New York and Pennsylvania. The Capital's summer starling population in the meantime is spending the winter as uninvited guests of communities in North Carolina and southern Virginia.

Occasionally, of course, you will see or hear of a normally migrating bird that hasn't bothered to migrate at all. Robins that remain through winter, sometimes consorting with flocks of rowdy sparrows, are among the most frequently reported of such cases. This probably represents a response to easily available handouts of food, rendering the southward trip unnecessary.

Science News Letter, November 27, 1948

ENGINEERING

Cloud Heights Computed From Planes in Flight

➤ THE HEIGHT of a cloud can now be accurately determined from aircraft in flight by means of a simple device, a modified illuminated gunsight, developed in Fort Monmouth, N. J., in Army Signal Corps laboratories.

The instrument is mounted on a frame and coupled to two indexing arms which slide along a graduated scale. In use, the gunsight is trained on some prominent

cloud feature which is then tracked for a minute or so. During this period of tracking, one of the indexing arms remains fixed on the scale and the other moves.

At the end of the tracking period the vertical distance between plane and cloud may be computed from the air speed, time of tracking and the difference in scale readings at the two arms. The actual cloud height above the earth is this distance added to or subtracted from the reading on the plane's altitude instrument, depending on whether the cloud is above or below the aircraft.

Science News Letter, November 27, 1948

PUBLIC HEALTH

If You're 65 Years Old, You Should Live To Be 80

➤ SIXTY-FIVE-year-olds today can look forward to living almost to the age of 80, statisticians of the Metropolitan Life Insurance Company assure them. The average white man aged 65 has 12 and two-thirds more years of life. The average white woman has even more, 14 and one-half years. For the fairly sizable proportions of persons who will reach age 75, there remain, on the average, seven and three-fourths years for men and more than eight and one-half years for women.

Science News Letter, November 27, 1948



MICROMAX CONTROL

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ALL ABOUT FOX TERRIERS: A Complete Manual on History, Care and Training with Practical Information on How to Breed High-Class Dogs—George Frank Skelly—*Judd*, 299 p., illus., \$4.00.

THE CHEMICAL TECHNOLOGY OF DYEING AND PRINTING: Vat, Sulfur, Indigosol, Azo and Chrome Dyestuffs and Their Auxiliaries—Louis Diserens—*Reinhold*, 500 p., \$11.00. Translated from the second German edition by Paul Wengraf and Herman P. Baumann. Especially for the chemist and colorist.

ECONOMIES IN SEASONING—*Northeastern Wood Utilization Council*, 75 p., illus., paper, \$2.00. Much high-grade lumber is lost in the seasoning process.

EXPLORING ELECTRICITY: Man's Unfinished Quest—Hugh Hildreth Skilling—*Ronald Press*, 277 p., illus., \$3.50. Fascinating tales about men who looked for new things in the field of electricity; from Thales, who discovered what rubbing amber could do, to Lawrence and the atom smasher, Oppenheimer and the bomb.

FUNDAMENTALS OF PSYCHOANALYSIS—Franz Alexander—*Notion*, 312 p., \$3.75. An attempt by an authoritative writer to formulate basic principles in the field and to indicate their application in treatment. Theoretical discussion is minimized in the interest of clarity for the student.

GUARDING OUR WILDLIFE RESOURCES—Rachel L. Carson—*Govt. Printing Office*, 46 p., illus., paper, 30 cents. All animal lovers will be interested in this beautifully illustrated booklet.

THE INTERNATIONAL GAME FISH ASSOCIATION YEAR BOOK 1948—*International Game Fish Association*, 72 p., illus., paper, free upon request to publisher at American Museum of Natural History, New York, N. Y. Fishermen all over the world have common interests and enthusiasms regardless of political boundaries.

LET'S MEASURE THINGS—E. Laurence Palmer—*N. Y. State College of Agriculture*, 63 p., illus., paper, free upon request to publisher at Cornell University, Ithaca, N. Y. One of the well-known Cornell Rural School Leaflets telling how to measure or estimate a variety of things from the weight of trout and size of shot to the intensity of light and the height of clouds.

NEWER SYNTHETIC ANALGESICS—M. L. Tainter and others—*New York Academy of Sciences*, 174 p., illus., \$2.75. An interesting symposium on pain and the most modern method of relieving it.

NO PLACE TO HIDE—David Bradley—*Little, Brown*, 182 p., \$2.00. The atomic era, the author points out, fortunately or otherwise is now man's environment, to control or to adapt himself to as he can. The public, for their own protection will have to match

natural laws with civil laws. Science and sociology are as inseparable now as man and his shadow. This book is concerned with the deadly radiation spread in the wake of the atomic bomb.

PUBLICATION OF DEGRADATION ABSTRACTS—*National Research Council*, 2,000 p. (approx.) per year, loose leaf with binder and index guides, \$37.50 per year. Abstracts are classified under headings such as biological agents, fungicides, leather, etc., An "Advance List," a monthly bibliography of reports received, is available for \$10.00.

SELECTED WORKS OF HENRY CLAPP SHERMAN: Mitchell Professor Emeritus of Chemistry, Columbia University—*Macmillan*, 1056 p., illus., \$5.00. Timely in this day when the feeding of the world is a major problem is this compilation of writings of a man invariably thought of in connection with nutrition.

A TREATISE ON THE NORTH AMERICAN RANUNCULI—Lyman Benson—*American Midland Naturalist*, 264 p., paper, \$1.25. Approximately 600 collections of this genus of flowering plant were made in 36 states, Canada and Mexico.

Science News Letter, November 27, 1948

AERONAUTICS

Jet-Propulsion Progress

➤ THE RECENT non-stop test flight of more than 3,400 miles made by the jet-propelled, eight-engined Northrop YB-49 Flying Wing bomber was a striking demonstration of the progress made in jet-propulsion in the six years since the first American jet-propelled fighter plane was constructed.

This "early" jet-propelled plane was the Bell Aircraft's Airacomet, the P-59A, whose development and production was announced by the Army in January, 1944. This airplane, fitted with two jet units built by General Electric to British designs, made its first flight on Oct. 1, 1942, 17 months after the first successful flight had been made in England with the Whittle jet engine, the prototype of the American power unit.

It was a single-seat plane, approximately 38 feet long and with a wingspan of 45.5 feet, that had a maximum speed of over 400 miles per hour, and a range limited by the amount of fuel it could carry. Its empty weight was about 8,000 pounds, while its loaded weight was somewhat less than 11,000 pounds.

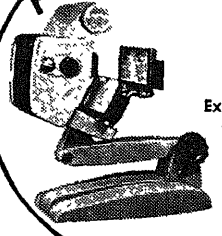
In contrast, the Northrop Flying Wing has a wingspan of 172 feet but is only 53 feet long because it has neither the conventional fish-shaped fuselage nor a tail. It is composed of two broad, back-sloping wings which are thick enough in the near-junction region to hold a crew of from six to 10 men, thousands of gallons of jet fuel, eight GE-designed, Allison-built J-35 jet engines, 15 tons of bombs, and other necessary equipment. It is in the 500-miles-an-hour class.

The U. S. Air Force has several other

jet-propelled bombers in addition to its speedy jet-propelled fighters. The Douglas XB-43 is said to be the first U. S. bomber designed for jet-propulsion. It is a twin-engine affair with a range of some 1,400 miles. The North American XB-45 was one of the first operational Air Force jet bombers. It utilizes four General Electric jet-engines.

The Consolidated-Vultee XB-46 is also a four-jet bomber. Its service range is about 800 miles. The Boeing XB-47, known as the Stratojet, has sharply swept-back wings and tail surfaces. It has six General Electric jet engines. The Martin XB-48 has six General Electric-Allison J-35 engines that develop a total thrust of 24,000 pounds. It has a bomb capacity of 10 tons, a speed of over 480 miles an hour, and a combat radius of some 800 miles.

Science News Letter, November 27, 1948



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❄️ **AUTOMATIC defroster**, for the electric household refrigerator, is a relatively small device which is plugged into an electric outlet and into which the refrigerator cord is plugged. It eliminates the necessity of hand defrosting, maintains a thin film of frost on the freezing unit and prevents ice from accumulating on it.

Science News Letter, November 27, 1948

❄️ **SHOCK-ABSORBING HAMMER**, recently patented, absorbs the rebound when a working surface is struck. The head, in two parts that screw together, has an elongated hollow on the inside which contains air and a slidable bolt-like part. Vents open from the air spaces at each end of the bolt to permit air movement in and out.

Science News Letter, November 27, 1948

❄️ **LIQUID CARBONATOR**, to charge an individual glass of water or other liquid with carbon dioxide with the use of dry ice, consists of a drinking glass which has a disk of sponge or porous glass set in its bottom and a shallow base into which the glass fits. A tiny piece of dry ice placed in the base discharges gas which passes through the porous inset.

Science News Letter, November 27, 1948



❄️ **SMALL circular valve**, shown in the hose line near the facepiece, permits oxygen to flow into a patient's lungs with intermittent positive pressure. It interrupts delivery of oxygen when the capacity of

the lung is reached and permits normal exhalation with suction.

Science News Letter, November 27, 1948

❄️ **SNOWPLOW WAX**, applied to plow moldboards and wings with a spray gun or with an ordinary paintbrush, creates a hard, slick surface off which the snow slides easily. It prevents the so-called snow piling which means costly clearing delays.

Science News Letter, November 27, 1948

❄️ **TOBACCO PIPE**, to give a mentholated smoke when desired, has a vaporizing chamber in its duraluminum stem into which a menthol ointment is placed. Unburned menthol vapor is picked up by the smoke as it is drawn through the stem.

Science News Letter, November 27, 1948

❄️ **BABY BOTTLE WARMER** and vaporizer combined is an electrically heated unit which when plugged into the ordinary household electric outlet forces hot water up through sidewalls and plays it against the sides of a contained bottle. For use as a vaporizer, a special cap is inserted in the top of the bottle warmer.

Science News Letter, November 27, 1948

• Do You Know? •

Metals five to ten times stronger than those of today are predicted.

Good food value is saved when potatoes are boiled whole in their skins.

Approximately 90% of the shellfish, principally clams, produced in Canadian Maritime Provinces is shipped to the United States.

The giant redwood and other trees of the coniferous group are rated by scientists as evolutionally less advanced than the humble dandelions and sweet peas of our lawns and gardens.

Bee losses in northern states are heavy during some winters, death coming from starvation, not cold weather; a normal bee colony may need as much as 90 pounds of honey to carry it through a long, cold winter.

Bamboos, some of which get to be 40 feet high, are rated by botanists as grasses.

Experts suggest covering newly laid water pipes with straw or hay during the first winter, even if they are installed below frost level; the earth fill over them is loose for a year or so and frost may go deeper than otherwise.

The 56 firms producing motor vehicles in the United States are supplied by more than 1,000 parts plants.

Nearly three-fourths of the fertilizer elements in the feed livestock eat is returned for re-use in the manure.

A 14,000-mile wildfowl survey was made from the air during the past summer over the Arctic slope of Alaska and the Canadian Northwest Territories.

Sunflower and safflower seed are coming into such increased uses in the United States for feed and oils that official grain standards have been established by one state, at least; this is Minnesota.

Fish in farm ponds grow more rapidly if the pond is fertilized; the fish do not consume the fertilizer directly, but they derive the benefit of increased growth of plankton, the tiny water plants which are their major source of food.

If automobiles had been invented 25 years earlier, it is a question if they could have developed enough power to move their massive engines because of the lack of proper alloy steel.

Science News Letter, November 27, 1948

Goggles coated with allyl sucrose, a sugar, are being tested by welders; the treated goggles may be used for many hours without changing, it appears.

The world's standard meter is a bar of platinum-iridium preserved in a deep underground vault near Paris, protected in a triple case of glass, hard rubber and wood.

SCIENCE SERVICE

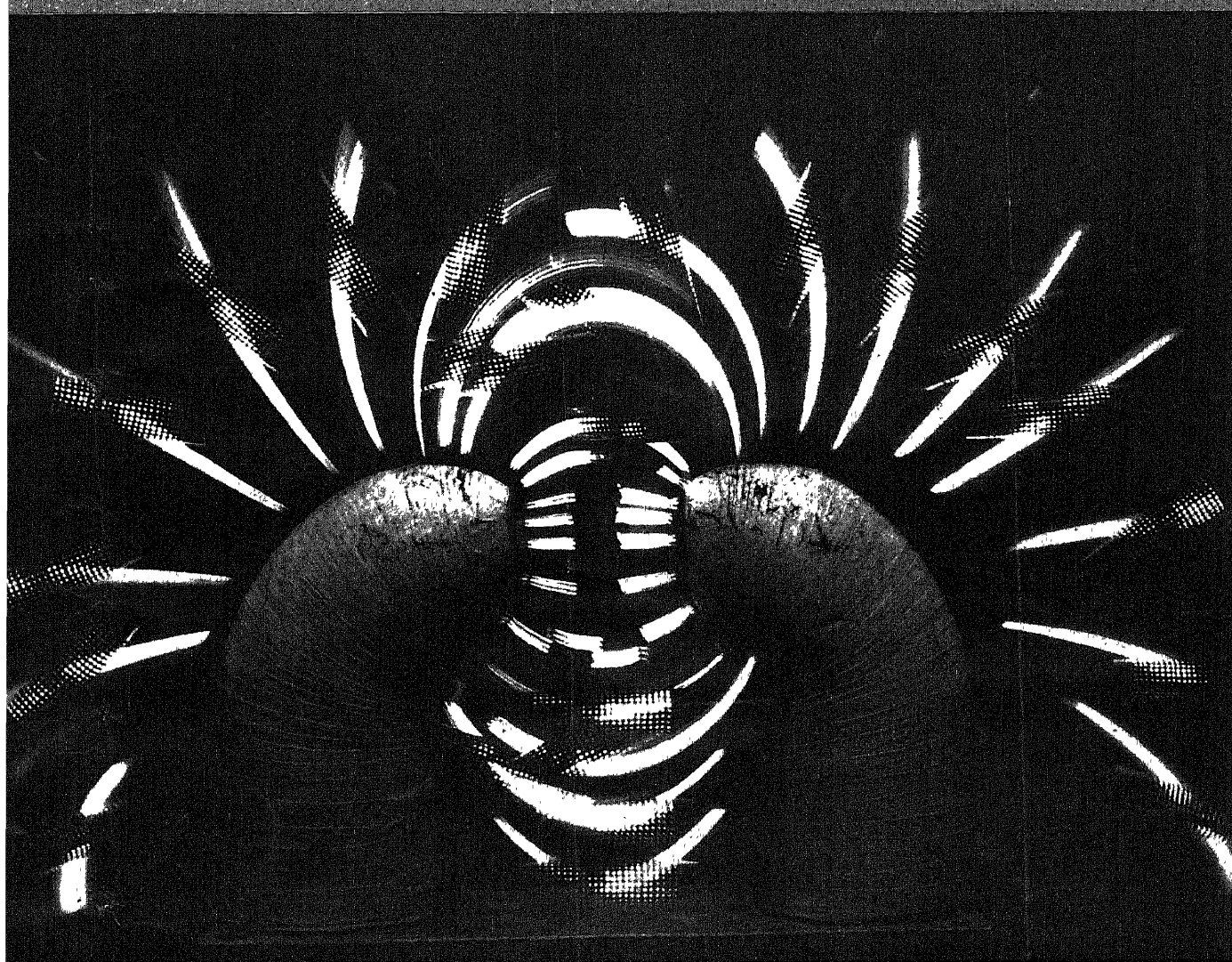
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December 4, 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Magnetic Lines

See Page 360

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VOL. 54 NO. 23

AERONAUTICS

Supersonic Air Transport

A future supersonic transport which would compete with other forms of transportation economically, was reported feasible by a scientist.

➤ **WEIGHT** for weight, a future supersonic transport plane flying at high altitudes will give as many miles per gallon of fuel as your automobile, the National Academy of Sciences was told in Berkeley, Calif.

Robert T. Jones of the Ames Aeronautical Laboratory of the National Advisory Committee for Aeronautics took issue with opinions that flight faster than sound will be "excessively wasteful." He declared that aerodynamic theory of slender plane bodies and wings indicates that supersonic flight will be competing with other forms of transportation economically.

The plane which Mr. Jones envisions as a future supersonic transport would carry a conventional load at an altitude of 60,000 feet. Design requirements of such a plane would enable it to fly slowly enough at low altitudes for landing.

Using present turbojet engines, this plane would give a fuel economy in miles-per-gallon that would "not fall far short of that achieved by other forms of transportation," Mr. Jones' studies indicate. The comparison was made on the basis of weight in relation to fuel requirements.

The supersonic plane would be much like today's air transports in many respects, but it would use sweepback wings to reduce the drag which results from going faster than the speed of sound. This type of wing is now incorporated on some high speed planes, as is the very slender body which the future supersonic craft would have.

When such a transport will be available, Mr. Jones did not estimate. But when it is flying, it will compete economically with other forms of transportation, he concluded.

Science News Letter, December 4, 1948

MEDICINE

Causes for King's Ill

➤ **IMPAIRED BLOOD** circulation to the legs from which the King of England is reported suffering, may arise from many different causes. Among them are infection, injury, heart disease and diabetes. Hardening of the arteries is another and a common cause of impaired circulation.

In artery hardening, the walls of the blood vessels thicken and lose elasticity. As a result, the lumen of the artery, corresponding to the bore of a hollow tube, becomes smaller and smaller. If it is entirely closed by this process, no blood can get through to nourish the tissues of that part.

This artery hardening condition, together with the blood vessel disease called thromboangiitis obliterans, or Buerger's disease, make up almost 95% of all cases of disease of the blood vessels of the extremities, according to one authority.

The probable outcome depends to some extent on whether arteries or veins are affected. For example, if the veins are affected, the great danger is that of a clot breaking loose and making its way to the heart or lungs where it may become fatal. If the arteries are involved, the consequent lack of blood supply may cause gangrene and the loss of a limb.

Pain is the most common symptom of diseases of the blood vessels of the ex-

trémities. The pain may range from a mild "gnawing" to excruciating. Weakness and fatigue of the affected limb are also common. Patients often have sensations of tingling and "pins and needles," or they may complain of numbness.

Treatment for these blood vessel diseases varies according to the condition. Tobacco is usually forbidden though alcohol may in some cases be allowed and even encouraged. Surgery, various drugs and physical therapy may be used. For clots, doctors in some cases use two relatively new anti-blood clotting drugs, heparin and dicumarol.

Radioactive tracer chemicals and fluorescent dyes are being used fairly widely to study the circulation through veins and arteries of the extremities in the hope of learning how they become diseased and how such conditions can be prevented or remedied.

Science News Letter, December 4, 1948

ENTOMOLOGY

Sowing DDT on Snow Keeps Mosquitoes Down

➤ **THE OLD PRACTICE** of sowing grass seed on March snow in order to insure a good lawn now has a parallel in the mos-

quito-fighting techniques being developed to make life more endurable in the Far North. U. S. Department of Agriculture entomologists, in cooperation with the Army and with Canadian scientists, have found that sowing DDT onto Arctic snow from airplanes is an effective means for keeping down the hordes of bloodthirsty insects that often make work out-of-doors impossible in the Far North.

As soon as the snow has melted and formed a wet sheet among the plants of the tundra, arriving mosquitoes are accustomed to lay their eggs. Now they find their erstwhile nursery a death-trap for both themselves and their young.

One advantage of the new technique is its relatively low cost. Sprinkled from low-flying airplanes, one pound of DDT is sufficient to treat 10 acres.

Science News Letter, December 4, 1948

WILDLIFE-AERONAUTICS

New Job for Jet Planes; Counting Ducks and Geese

➤ **THE TOUGH JOB** of counting wild ducks and geese at their wintering grounds was made easy and speedy with a jet plane and high-speed camera, the U. S. Fish and Wildlife Service reported.

The plane, a U. S. Air Force RF-80, photographed with a Sonne S-7 camera a 22-mile strip of marshes where wildfowl were feeding in California's San Joaquin Valley in 3.3 minutes recently. A ribbon picture 9.5 inches wide was made with the camera, which was synchronized with the 400-miles-per-hour speed of the plane.

Aerial surveys with slower planes have been handicapped by the roar of the plane's engines which frightened the birds and caused them to break into flight. Some of them would fly out of the camera's range. But the jet plane went over the ducks and geese before they were aware of its noise.

Science News Letter, December 4, 1948

CHEMISTRY

Capacitron Sterilization Helped by Partial Vacuum

➤ **CAPACITRON** sterilization of foods and medicinal products such as serums and vaccines is accomplished more quickly and with fewer undesirable by-effects if it is carried out in a partial vacuum, state Drs. Arno Brasch and Wolfgang Huber of the Electronized Chemicals Corporation, in the journal, SCIENCE (Nov. 12).

This improvement in the sensational new method for low-temperature preservation works best on finely powdered solids, slightly less well on liquids and compact solids. Desirable reduction in exposure time can be achieved by stepping up radiation intensity.

Science News Letter, December 4, 1948

CHEMISTRY

New Fiber Rivals Nylon

Synthetically produced "orlon" is credited with great strength, superior resistance to wear, heat and chemical action. Quantity production has not yet begun.

➤ A NEW synthetic fiber that will rival and surpass nylon in many uses is about to go into production. It is named by one company "orlon" and it is made from acrylonitrile, one of the ingredients of the synthetic rubber known as Buna N.

DuPont, also producer of nylon, is understood to have a plant being designed for production of orlon, which is the mysterious Fiber A that has been rumored for some time. Other chemical manufacturers, especially American Cyanamid and Rohm & Haas, produce acrylonitrile and may be expected to offer the new plastic.

The new fiber is said to possess great strength and to have superior resistance to wear, heat and chemical action.

Stockings, underthings and other clothing will not be made from it, because nylon is superior for such uses, but orlon will be used for curtains in homes, hotels and elsewhere and for industrial uses for which nylon has some shortcomings. One disadvantage in the new fiber is that it cannot be dyed as effectively as nylon. Orlon will also have use as sheets and in other solid forms.

Samples of orlon are known to have been

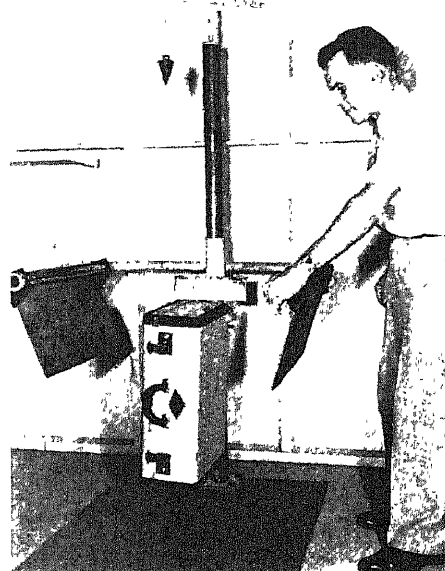
distributed quietly for testing and evaluation by manufacturers and plastics users. Quantity production has not yet begun.

The basic chemical, acrylonitrile, is made primarily from petroleum, like so many other similar chemicals. The fiber is made by polymerizing the chemical, that is, treating it so that the molecules in it have a chance to grow bigger and longer, giving it a structure useful in fiber.

Improvements in chemical processes have made the acrylonitrile cheaper to produce. Combined with the desirable qualities of the orlon fiber, this has spurred the expected production.

Some of the earliest synthetic rubbers made in America before and during the recent World War were copolymers of acrylonitrile and butadiene. These rubbers were tradenamed Hycar or Ameripol and Chemigum, while Buna N is the present usual designation. The most widely produced synthetic rubber of the government's war program is made from butadiene and styrene and called Buna S. With cheaper acrylonitrile, greater commercial interest in the Buna N rubber is expected, because in some respects the acrylonitrile rubber is better than the styrene rubber.

Science News Letter, December 4, 1948



FOR MORE DURABLE LUGGAGE
—A luggage smashing machine is shown in operation to determine the resistance to strain of the baggage. Tests closely duplicate stress encountered in travel.

GENERAL SCIENCE

"Baggage Buster" May Improve Suitcase Quality

➤ SMASHING LUGGAGE using a "baggage buster" which drops a 150-pound weight on a suitcase is one of a new series of tests at the National Bureau of Standards which may lead to more durable luggage for you in the future.

It's all part of a test to determine the durability of hand luggage. The Bureau wrecks all kinds of baggage to find out which ones take punishment best—the kind of punishment that your suitcases face each time you take a trip. Luggage is dropped from heights, picked up and set down by machine, punctured by special tools, all to determine its resistance to strain.

To check the results of the mechanical test, a set of bags was loaded and sent on a 12,000-mile trip around the country. Results of this trip and the mechanical test were almost the same, indicating that the Bureau's methods give a good test for stress encountered in actual travel.

Through heaps of destroyed luggage, the Bureau's scientists have emerged with a tentative standard for the strength of suitcases which may result in the development of new and stronger types of baggage. A piece of luggage, the Bureau says, should be able to withstand a weight of 150 pounds, dropped on any side. It should be able to take 25,000 pick-up motions of the machine and withstand rough dropping from various heights.

Science News Letter, December 4, 1948

ENGINEERING-AERONAUTICS

Jet Discharge Measured

➤ CHANGES IN DENSITY in supersonic gas jets, such as rocket and engine jets, can now be measured without inserting any sort of probe into the stream and without interfering with its flow.

John Winkler of the Palmer Physical Laboratory, Princeton University, has developed an optical system which can detect changes in density of gases issuing from a jet by passing a beam of light through it. An electric arc, struck from magnesium electrodes, furnishes a monochromatic light which by a system of lenses and prisms is split in half, and half the light passed through the jet under study. A delicate optical comparison between the two halves of the light beam then shows how much the one has been slowed down by passage through the gases.

The sensitive system can trace flow lines of the streams of gas from the jet and then by suitable calculations scientists can arrive at values of pressure and temperature which are valuable in the study of

jets. Heretofore, wires and tubes had to be stuck into the jet for such measurements and these interfered with the free flow of gas. This type of investigation is especially valuable for transonic and supersonic velocities where effects of compressibility become noticeable.

Shadow photography, which has long been used in studying the flight of bullets, aids in the study of jets by recording information to supplement Mr. Winkler's optical method. The shadow photographs show the geometrical shape of the shock fronts and slipstreams.

The new method is based on an older device developed by Mach in 1892 with which he measured the amount of bending of a beam of light as it passed through a denser substance.

Mr. Winkler reported that during his investigations he discovered that in 1930 the Zeiss optical works of Germany had built a large type of one of the earlier models of the instruments for Russia.

Science News Letter, December 4, 1948

PHARMACOLOGY

Pills Made Easy To Take

Medicines today are packaged in sugar-coated tablets and gelatin capsules to camouflage their bitter taste. Some containers are colored to avoid confusion.

➤ **YOU SWALLOW** many bitter pills these days without knowing that the medicine is bitter, thanks to sugar-coated tablets and gelatin capsules.

Hard, non-flexible capsules and soft, elastic ones are both used as containers for individual doses of medicine. Powders are packaged in the tough body of the familiar capsules before the cap is fitted on; measured quantities of oily liquids are poured into the flexible gelatin as the elastic capsules are being made.

Gelatin is usually preferred as the container for medicines because it is tasteless, dissolves easily and does not harm the patient. Gelatin shells made soft and elastic through the addition of glycerin permanently retain this flexibility.

Colored capsules are used to avoid confusion when a person is taking several kinds. Sometimes the transparent capsule shell is colored, sometimes the ingredients are tinted. When necessary, the shell can be made opaque to keep light from destroying light-sensitive ingredients such as vitamin B₂ or riboflavin.

Medicine today is compounded and packaged quite differently from the way it was prepared 25 to 50 years ago. New practices make possible more exact dosages, greater cleanliness and more appetizing preparations.

Tablets and capsules are rapidly replacing the pills of our grandparents' time. Cachets or wafers for bitter powders today are seldom seen in the United States. New processes for preparing unstable liquids have been introduced.

As many as 50 microscopic coatings of sugar solution are applied to a compressed tablet to give it the desired thickness. No color is added to the coating material used at the beginning; only the last few additions are tinted pastel shades to make them more appealing and palatable, and to protect the medication against the deteriorating action of the atmosphere. It often takes eight hours to apply the numerous coatings.

The drug industry employs a special method of dehydration to increase the stability of biological and pharmaceutical products which are unstable in liquid form. This lyophile process consists of freezing the liquid and evaporating the water in a vacuum. The water never becomes liquid, but passes directly from ice to vapor.

Samples demonstrating the latest methods of preparing medicines have been collected for you through the cooperation of Sharp & Dohme, one of the country's leading pharmaceutical houses, and Science Service. Several of them were specially prepared for the kit so none of the nine specimens would contain medication. Thus you, or your pet cat, will be none the worse for swallowing the tablets and capsules.

The capsules range in length from a half-inch, for small doses for humans, to 2 1/4 inches, to give large amounts of medication to horses and pigs. One is soft and elastic, the other stiff and non-flexible.

Uncoated and coated compressed tablets, a lozenge and a molded tablet demonstrate the more common methods of preparing medicine. Directions are given for making

pills, today largely replaced by compressed tablets.

Lyophilized gelatin and distilled water are also included so that those unfamiliar with this process can see a product dehydrated in this manner, now widely used in preparing penicillin, streptomycin and blood plasma.

These specimens, with a leaflet telling how they were made and experiments that can be performed with them, may be secured by sending 50 cents to Science Service, 1719 N St., N. W., Washington 6, D. C. Just ask for unit No. 97.

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CHEMISTRY

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What qualities make a new fiber rival of nylon? p. 355.

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ENGINEERING

How would the suggested trestle-tube combination across San Francisco Bay be constructed? p. 358.

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By what new method can changes in density of supersonic gas jets be measured? p. 355.

GEOLOGY

By what method may the history of the earth be revealed? p. 366.

RADIOBIOLOGY

In what ways is the printed word getting the "new look"? p. 362.

CHEMISTRY

"Cold" Rubber for Tires

The superiority of this synthetic product to natural rubber has hastened the conversion of plants to make possible large-scale production.

➤ **MAN-MADE** "cold" rubber makes markedly superior tires and other products and surpasses the natural tree-grown rubber. It is now going into large-scale production in America's chemical rubber plants.

What is happening is a new chapter in creative chemistry. During the recent war scientists made rubber from petroleum. They made this nation independent of unavailable natural rubber and gave us the essential tires for military and civilian transport.

Now the famous war-time GR-S rubber is being surpassed by post-war development of low-temperature manufacture, new chemical catalysts, and superior carbon black for compounding.

The rather chilly temperature of 41 degrees Fahrenheit, just nine degrees above freezing, is being used in the major cold rubber production. The temperature at which standard GR-S rubber is made is 122 degrees Fahrenheit.

Plants Being Converted

Over half of the operating capacity of the government-owned synthetic rubber plants, 200,000 out of 376,000 tons per year, is now in the process of being converted to cold-rubber production through installation of the refrigerating equipment necessary. Present plants do not need to be changed except to install tanks, compressors and other machinery for working at the lower temperature necessary. Eight out of the nine operating plants (all but the Akron plant) are being converted.

Glowing reports of the superior qualities of cold rubber have hastened the rush to its production. Synthetic rubber is now at least as good as the natural product, and most reports credit the low-temperature sort with being 20% to 40% better in wear. It does not heat up when tires are run at high speed any more than the natural sort, which was a fault of the older synthetic tires.

You may be getting some of the new cold rubber in tires that you buy without knowing it because tires made from it are not being labeled or advertised as such due to the present small production. In about a year most of the tires made are expected to be made with cold rubber.

Butadiene and styrene, polymerized together, are used to make cold rubber just as these two chemicals are the basic materials of the standard GR-S rubber. In polymerization, big molecules are made out of little ones. One key to low-tempera-

ture rubber production is the new sort of catalyst. In rubber technology, catalyst means an oxidizing agent that promotes polymerization and is used up in the process.

In the older synthetic rubber manufacture, potassium persulfate was used as catalyst, while in the cold rubber process cumene hydroperoxide is used. This organic peroxide was worked out in the University of Minnesota laboratories under the direction of Dr. I. M. Kolthoff and is a key ingredient of the low-temperature process, making it possible to complete the chemical reaction in a reasonable time, despite temperature.

Soap of fatty acid or rosin types is used in any kind of synthetic rubber formula in relatively large quantity to emulsify the chemicals used. More soap is used than styrene, one of the two chemicals that constitute the rubber.

In compounding the synthetic rubber into vulcanized products, such as tires, a new kind of carbon black, finely divided carbon filler for the rubber, is contributing greatly to the quality and economy of the product. This HAF or furnace black, as it is called, is made from oil or enriched natural gas.

Since synthetic rubber is a government operation growing out of the war situation, its price is controlled and set by the Office of Rubber Reserve. At present it is 18 1/2 cents a pound which compares with the current 22 1/2 cents a pound for natural rubber which is controlled by the British monopoly. Synthetic cold rubber is therefore cheaper as well as better than the natural material.

Latex rubber used in cord tire dipping, adhesives, rubber foam, textile coating, etc. is also being made by the low-temperature process with development of high gum tensile strength.

Because the synthetic rubber development is a government-industry undertaking, the cold rubber research and production is largely cooperative. Various rubber companies and research laboratories exchange information and work together.

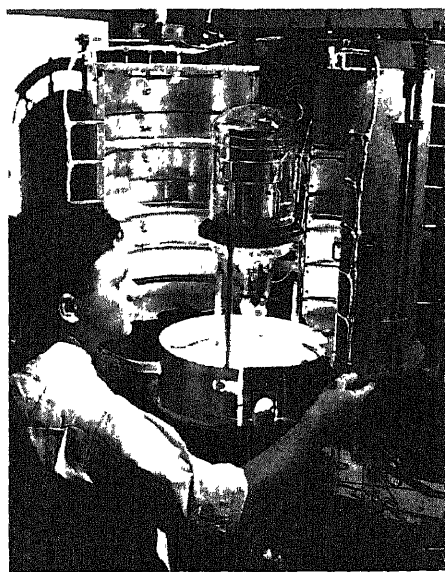
The next step in cold rubber production will be to apply even lower temperature in hope of getting better and better quality rubber. One rubber company has made small scale polymerization at as low as 40 degrees Fahrenheit below zero, and some of this rubber has been tested in tires. Below-freezing processes are receiving fairly large scale, semi-commercial trials, with 14 degrees and 0 degrees as the temperatures being used. When subfreez-

ing levels are encountered, anti-freeze must be used in the water used, just as in automobile radiators. This complicates the process. The lower temperatures also require more refrigeration.

Cold rubber promises to withstand better the arctic temperatures that trucks and other equipment must encounter in case of another war. Rubber made at 41 degrees also does not crack as easily as ordinary rubber.

Low-Temperature Rubber

Hints of the possibility of low-temperature rubber production antedate the government rubber program that began in 1940. It was early recognized that low-temperature polymerization would produce rubber of better quality, but the 122-degree temperature was adopted because the emergency was great and the standard process gave known results with the reaction running 14 hours. During the war the "speed-up" chemicals increasing the polymerization rates at low temperatures were developed, and German experience with low temperature rubber recipes became known. With the end of the war, the effort to improve the process could be resumed. The use of what is called the "redox" system, involving oxidizing ("catalysts") and reducing agents, was refined and ap-



500 TIMES BRIGHTER—The large electronic tube shown here is the first working model of the X-ray "telescope" which will brighten by 500 times the living image viewed by the doctor on the screen of the X-ray fluoroscope. Westinghouse scientist Dr. Richard L. Longini is shown closing the doors of a special electric furnace in which the tube will be baked and evacuated of air.

plied, with the practical results coming this year on a considerable scale.

Most of the rubber companies contributed to the development. The first pilot plant production of low temperature polymers was made by Phillips Petroleum Company in the late spring of 1946, while shortly after the middle of 1946 Goodyear produced a ton for experimental use. The U. S. Rubber Company made the first plant scale run of low temperature rubber experimentally in the summer of 1947, while the Copolymer Corporation at Baton

Rouge, La., after pilot plant operation the same year, converted half of its 30,000 ton capacity to 41 degree rubber early this year.

Plants now being converted to cold rubber production are: Copolymer Corp., at Baton Rouge, La., U. S. Rubber Co. at Naugatuck, Conn. and Borger, Tex., Goodyear Synthetic Corp. at Houston, Tex., and Los Angeles, Calif., Firestone Tire and Rubber Co., at Lake Charles, La., B. F. Goodrich at Port Neches, Tex., General Tire and Rubber Co., at Baytown, Tex.

Science News Letter, December 4, 1948

ASTRONOMY

Palomar Giant Incomplete

► THE 200-INCH telescope atop Palomar Mountain is about to begin to probe the universe.

Nothing but test pictures have been taken to date with this giant telescope, dedicated six months ago (June 3).

When completed, the telescope will penetrate twice as far into space as previously possible. It will make available eight times the volume of space astronomers now have at their disposal.

But testing and adjusting is a time-consuming job, reports Dr. Ira S. Bowen, director of both Mount Wilson and Palomar Observatories. Progress is "good," and no slower than anticipated.

Latest estimates indicate that the Hale telescope, to be operated jointly by California Institute of Technology and Mount Wilson Observatory of the Carnegie Institution of Washington, will actually go into operation late next spring.

Latest score on the world's largest telescope shows:

Final adjustments must be made on the 200-inch mirror.

Two of the telescope's seven mirrors have yet to be finished, installed and adjusted.

Coude spectrograph is still incomplete.

Ross correcting lens remains to be installed at the telescope's prime focus.

The telescope is a reflector, not a refractor. Thus it is made of mirrors rather than lenses. The 200-inch mirror, of course, is the largest of these. It weighs 14 3/4 tons.

Minor modifications were made on the support system for the telescope this summer, and new adjustments are now being completed. More tests are being run to check the mirror.

Three respects in which this telescope will surpass all other telescopes are:

Dispersion, of importance in the study of the relative abundance of elements in the universe.

Resolving power, of value in deciding whether there are canals on the planet Mars, thus indicating whether or not intelligent beings exist there.

Space penetration, helpful in deciding whether the universe is expanding, as many astronomers believe.

When finally completed, the telescope will catch on photographic plates light that started its journey to the earth a billion years ago.

Science News Letter, December 4, 1948

ENGINEERING

Trestle-Tube Proposed

► A UNIQUE combination of bridge, earth-fill and subway tube across San Francisco Bay, to handle increasing highway traffic now beginning to overtax the San Francisco-Oakland Bay Bridge, is suggested in an official report to the State of California.

The tube, considerably over a mile in length, would extend from the end of a bridge on one side to an extended earth-fill on the other, dipping between into the floor of the bay. It is one of two plans recommended in the report by Ralph A. Tudor, chief engineer of the California Division of San Francisco Bay Toll Crossings. The other is a twin bridge parallel to the present structure.

The trestle-tube combination presents difficult engineering and geological problems which both engineers and geologists believe can be solved. The soft mud at the bottom of the channel is one of the principal of these. The proposed solution is to dredge it out to a hard base, and to put in its place a foundation of sand.

The total crossing would be some six and one-half miles in length. The trestle bridge would be about one mile long. The proposed tube would be approximately 6,000 feet in length, and an earth-fill would occupy the rest of the crossing length. Three parallel tubes are proposed. Each would be 37 feet in diameter and constructed of reinforced concrete. They would

be constructed near shore in three sections with bulkheads, and floated to position. Giant cranes would lower them to the prepared bed of sand, where the sections would be joined together.

Geological studies of the channel mud bed have already been made under the direction of the supervising geologist, Parker D. Trask, of the San Francisco Bay Toll Crossings. He states that the depth of mud to be removed runs up to 50 feet. Suitable sand for replacement has been located about five miles away.

The sloping tubes on both ends would be supported and protected by sand islands extending well above the high-water line. The islands themselves would be protected from current and wave action by heavy riprap. This combination scheme leaves a clear unobstructed channel for shipping. A tube for the entire crossing distance is economically impracticable.

Science News Letter, December 4, 1948

AGRICULTURE

"Turkish" Tobaccos Now Grown in United States

► THE UNITED STATES may soon be able to declare independence again—this time from Turkey. Turkish-type tobaccos, noted for their high aroma volume, are necessary ingredients of all quality cigarettes.

Spurred by wartime shortages, plant scientists at Duke University under the leadership of Dr. Frederick R. Darks have successfully grown high-aroma tobaccos in cooperation with the agricultural experiment stations of Virginia and the two Carolinas. The new American "Turkish" tobaccos are also low in nicotine.

Science News Letter, December 4, 1948

METEOROLOGY

Sun and Moon Cause Tides in Atmosphere

► UNOBSERVED by human senses, two daily tides sweep through the ocean of air at the bottom of which we live. Their existence and causes were discussed by a noted Norwegian meteorologist, Dr. J. Bjerknes of the Geophysical Institute of Bergen, before the meeting of the National Academy of Sciences in Berkeley, Calif.

One of the tides is a response to the pull of the moon, the other to that of the sun, with the solar air tide much the higher. Its crests come at 10 a.m. and 10 p.m. at sea level; but there is a "tilt" in their height, Dr. Bjerknes stated, so that on a mountain 17,000 feet high the crests come at noon and midnight. He presented results of calculations tending to show that the amplitude of the solar air tide is strengthened by the heating effect of the sun.

Science News Letter, December 4, 1948

RADIOBIOLOGY

Atomic Radiation Hazards

Scientists disagree over meaning of the atomic bomb threat. One holds out hope that some symptoms can be treated, the other warns that there is no defense.

➤ HOW GREAT is the threat of atomic radiation to you and me?

Two physicians who studied on the spot the biological effects of the explosions of atomic bombs have just weighed their scientific evidence and come up with different verdicts. There is little difference over facts, but a big difference in what these scientists find the facts mean to us.

The "mystery" of radiation gets a "partial debunking" from Dr. Austin M. Brues of the Argonne Laboratory and the University of Chicago's Institute of Radiobiology and Biophysics. He investigated radiation effects in Japan after the atomic bombings.

Writing in the *BULLETIN OF THE ATOMIC SCIENTISTS* (Nov.), published in Chicago, Dr. Brues says that radiation, "like many other things, creates an illness, some symptoms of which can be counteracted by known treatment." He believes we can hope reasonably to find further treatments for this illness.

"Cancer may be made more likely to occur by radiation exposure, but exposure to sunlight will also increase one's chances of skin cancer," Dr. Brues points out.

As for the genetic effect of radiations on future generations, the scientist declares: "Chemical agents are known, in fact (and some of them may be encountered in ordinary life), which will cause genetic mutations."

Radiations, he adds, have no effect that cannot be duplicated by some drug or chemical which is known. As a matter of fact, he argues, Geiger counters and other instruments can do a better job of detecting dangerous radiation than scientists can do in tracing some poisons.

More dangerous in modern warfare than atomic radiations, Dr. Brues cautions, may be the panic caused by fear and ignorance of effects of radiation. This was only a secondary factor in the atomic bombing in Japan, but it might be worse in this country in event of war, Dr. Brues warns.

Less hopeful than Dr. Brues, is Dr. David Bradley in his gloomily-titled new book, *NO PLACE TO HIDE*, (Atlantic-Little, Brown). Dr. Bradley served in the radiological safety section at the Bikini atomic bomb tests. His book is a log of his experiences at Bikini.

Dr. Bradley's conclusion:

"1. There is no real defense against atomic weapons.

"2. There are no satisfactory counter-measures and methods of decontamination.

"3. There are no satisfactory medical or sanitary safeguards for the people of atomized areas.

"4. The devastating influence of the Bomb and its unborn relatives may affect the land and its wealth—and therefore its people—for centuries through the persistence of radioactivity."

Describing the instruments for detecting dangerous radiation, Dr. Bradley says, "It is perfectly clear that nature had no intention that any of her children should be monkeying around with radioactive elements, else she would have provided us with some sixth sense to protect us from running headlong into dangerous amounts of radiation."

But he agrees that radiation sickness is "a definite and predictable disease. We know more about it than we do of measles."

Of the dangers of radiation, Dr. Bradley, too, warns of ignorance and fear. Radiation characteristics he finds "real and impressive enough without investing them

in the terrors of the supernatural."

Both scientists seem to agree that public understanding of radiation and its hazards is one vital hope for living with harnessed atomic energy.

Science News Letter, December 4, 1948

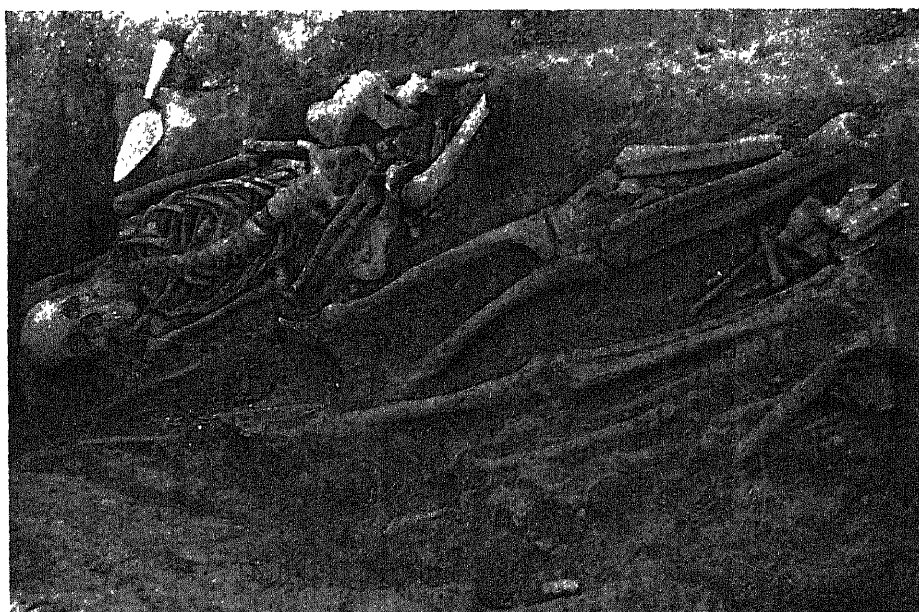
ARCHAEOLOGY

Indian Skeleton Found With Head Under Arm

➤ A BRITISH music-hall hit of some years ago, still popular as a recording in this country, recounts how the ghost of a certain "lady" went about in the Tower, o' nights, "With 'er 'ead tucked underneath 'er arm." An early American counterpart of this situation has been discovered in an Indian grave near Monona, Wis., excavated jointly by scientists of the University of Wisconsin and Beloit College. The skeleton they dug up was normal in all respects—except that the skull was tucked under the bones of its left arm.

The site, known as Frost Woods, promises to become an archaeological classic, for it comprises a dozen or so mounds of the high Indian culture known as the Hopewell, first found in southern Ohio, but since proven to have existed at least as far west as Iowa. Many of her skeletons, most of them fragmentary, have already been excavated there, as well as a large number of artifacts.

Science News Letter, December 4, 1948



INDIAN REMAINS—Believed to be remnants of the ancient Hopewell tribe whose civilization flourished some 10 or 15 centuries ago, these skeletal remains, found in Frost Woods, Wis., are said to be in "remarkably good" state of preservation.

PHYSICS

New Electron Tube Makes Magnetism Visible

See Front Cover

➤ A PHOTOGRAPH of the paths taken by magnetic lines of force with the aid of a new electron tube developed by Prof. Samuel G. Lutz and S. J. Tetenbaum, a graduate student, at the New York University College of Engineering, is shown on the cover of this week's SCIENCE NEWS LETTER.

When electricity is sent through the tube, technically called a mercury vapor diode with a perforated anode, a ball-shaped bluish glow is visible. When the lighted tube is brought near a magnet the glow changes into a spiral and finally into a group of intense blue lines of illumination, curved or straight, to conform with the magnetic field.

Dr. Lutz said that the new tube will be useful as a demonstration device and as a means for observing unusual magnetic fields. The photographic technique employed is not difficult, involving a series of exposures made in a darkened room on one film. The tube is held in a number of positions for a set length of time in order to record the shape of the field being investigated. When the film is developed, these successive exposures appear superimposed as distinct white lines.

Science News Letter, December 4, 1948

CHEMISTRY

Steam Rather than Steel Makes Safe Fire Resistant

➤ STEAM, not steel, makes an approved safe fire resistant.

Edwin H. Mosler, Jr., of the Mosler Safe Company in Hamilton, Ohio, explains that vaporizing of moisture in chemically combined form in the insulation actually does the trick. During a fire, the moisture becomes steam at 212 degrees Fahrenheit. Great amounts of heat are dissipated in the transformation, thus keeping the inside safe temperature well below the danger point of 350 degrees Fahrenheit at which paper and records are likely to begin igniting.

Fusible plugs in the outside plate melt at a low temperature to provide minute vents through which the steam harmlessly escapes.

Science News Letter, December 4, 1948

NUTRITION

B Vitamins Now Number 12 Or More; Food Best Source

➤ AT LEAST a dozen different B vitamins exist. Ten of them can be obtained in pure crystalline form. But there are

probably more B vitamins awaiting discovery.

The 10 that have been obtained in pure form, as summarized by Dr. C. A. Elvehjem of the University of Wisconsin in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 27) are: thiamine, riboflavin, nicotinic acid (niacin), vitamin B₆, pantothenic acid, choline, biotin, inositol, para-aminobenzoic acid, and folic acid.

"The common foods still remain the best source of these vitamins in practical nutrition," Dr. Elvehjem states.

One reason is that foods supply all the unknown ones along with the known ones.

The B vitamins occur in different proportions in different foods, and also in different commercial vitamin concentrates. Oatmeal, for example, contains more than twice the amount of thiamin that liver does, but only one-twentieth the amount of riboflavin that is in liver.

Commercial concentrates are valuable for treating specific deficiencies of one or another of the B vitamins. But unless properly used, they give no greater security of supplying all the B vitamins one needs than the proper combination of natural foods.

Science News Letter, December 4, 1948

BIOCHEMISTRY

New Insecticide Can Cause Hereditary Plant Changes

➤ GAMMEXANE, or 666, the new and highly potent insecticide, is capable of causing the plants it protects to produce changeling offspring unless another chemical is used along with it to prevent this undesirable action. At certain concentrations its effects are like those of colchicine, checking cell division in mid-career and thus artificially doubling the number of chromosomes. This results in sudden hereditary changes, often causing the production of giants in following generations—and giants are not always desired by plant growers and breeders.

Another effect, more immediate, is the growth of tumors and other deformities in the immediate generation on which it is used.

Discovery of a compound that will neutralize this effect of Gammexane is announced in the journal, SCIENCE (Nov. 19), by a three-man research team who have been working on the problem at Columbia University and the U. S. Department of Agriculture's experiment station at Beltsville, Md. The compound is a member of the vitamin B group, known technically as meso-inositol. It is found in both animal and plant tissues, and its tumor-preventing properties were already known.

The research team consists of Drs. Erwin Chargaff, Robert N. Stewart and Boris Magasanik.

Science News Letter, December 4, 1948

IN SCIENCE

DENDROLOGY

Scattered Tree Cousins Once Lived Close Together

➤ FOUR RELATED kinds of trees that are now widely scattered strangers, though all of them are members of the same plant family, grew as near neighbors a few tens of millions of years ago, Dr. Ralph W. Chaney of the University of California told the National Academy of Sciences meeting in Berkeley, Calif.

The trees in question are the bald cypress of our southeastern states, the sequoias of California, the China cypress or glyptostrobis of southern China, and the recently discovered "dawn redwood" of interior China. The two Chinese genera are now the nearest neighbors, and even they are separated by hundreds of miles.

Yet in Miocene geologic time, some 20,000,000 years ago, all four genera grew in a limited area in interior Oregon. They had got there from their points of origin in Alaska and elsewhere in the Far North, taking about 20,000,000 years for the trip. Now their fossil remains are all found together within a 60-mile distance, in a geologist's paradise known as the John Day Basin.

Though their fossils are found in this basin, the trees themselves have long since disappeared from it, and their present widely separated habitats differ sharply from each other in both topography and climate.

Science News Letter, December 4, 1948

GEOLOGY-PALEONTOLOGY

Millions of Years Added To Rocks by Shark Spines

➤ ANCIENT shark spines, discovered in South America by a University of Cincinnati scientist, have set back the age of some rock formations by at least 100,000,000 years.

Dr. Kenneth E. Caster, paleontologist, just returned from an exchange professorship at Sao Paulo, Brazil, explained that the shark spines and associated fossils were the first of their type ever to be found in Devonian rocks of the Paleozoic age. Rock formations thought to be 200,000,000 to 250,000,000 years old are now believed to be 350,000,000 to 400,000,000 years old, because of the new discoveries.

First fossils of giant sea scorpions ever found in the southern hemisphere were also identified by Dr. Caster. The scorpion remains occur in great abundance in the Brazilian state, Piaui, but they had been previously identified as plant fossils, the scientist said.

Science News Letter, December 4, 1948

E FIELDS

ACOUSTICS

You Can "Get Het Up" If Noises Become too Noisy

➤ **THERE IS DANGER** in a very intensely noisy world of temporary loss of hearing, getting hot due to sound absorption and even interference with moving of muscles properly.

Two Air Force scientists told the Acoustical Society of America in Cleveland how jet engines roaring in confined space and powerful sirens produce physiological effects in human beings and animals. Temporary hearing losses of as much as 70 decibels (about enough to make it difficult to hear ordinary street noise) were recorded immediately following exposure of men to the siren sound, even when conventional ear defenders were worn.

Rats and guinea pigs exposed were found to convert to heat enough sound energy to raise their body temperatures 20 to 30 degrees Fahrenheit and produce death in as little time as 10 minutes. The scientists found that a lethal sound field might be only one to three decibels more intense than one which will not kill.

The researches were done by Lieut. Donald H. Eldredge and Dr. Horace O. Parrack of the Biophysics Branch, Aero Medical Laboratory, Air Materiel Command, Wright Field, Dayton, Ohio.

Fur increases the absorption of sound as the frequency increases, that is, the sound gets shriller. Dr. H. E. von Gierke of the same laboratory reported that shaved skin absorbed less and less sound energy as the frequency increased above a thousand cycles per second, whereas furred skin absorbed more and more.

Science News Letter, December 4, 1948

ENGINEERING

Gas Produced Economically From Oil by New Process

➤ **HOUSEHOLD GAS** from low-cost oil can be made by a new economical process, it was revealed in New York by the American Gas Association. The process utilizes troublesome coke deposits in present methods as fuel for heat to gasify heavy oil.

Present oil gas processes are unable to use the cheaper, heavier oils successfully because their large carbon content forms excessive quantities of petroleum coke within the gas generator. This makes it necessary to remove the generator from service from time to time so that the equipment can be purged with air currents to burn out the coke.

In the new process, an invention by Edwin L. Hall, director of the American Gas Association laboratories at Cleveland, Ohio, the coke deposit is burned off during the gas-making period and supplies a good portion of the heat necessary for gasifying the heavy oil without requiring any additional time.

The process, tested for a year in a commercial installation, makes possible a reduction of 30% or more in the cost of gas-making materials, the association states, and an increase of about 35% in thermal capacity of existing gas-making apparatus.

Science News Letter, December 4, 1948

NUTRITION

High School Boys Eat Better than Girls

➤ **HIGH SCHOOL** boys are better eaters than girls, not only in quantity but in quality, Dr. Frederick J. Stare of Harvard found in a survey of New York State school children. And the grade school youngsters know their vitamins better, as shown by what they eat, than their older brothers and sisters. City children fared better than rural children, those in academic schools ate better, nutritionally speaking, than those in vocational schools, and, as might be expected, children of parents at higher income levels had better diets than those whose parents were not so well off. Dr. Stare's findings were presented to the American School Health Association meeting in Boston.

Science News Letter, December 4, 1948

AERONAUTICS

Altitude Record Set by Signal Corps Balloon

➤ **A NEW** balloon altitude record of 140,000 feet was established recently in weather forecasting and rocket launching experiments at the Evans Signal Laboratory, Belmar, N. J.

Lt. Col. A. F. Cassevant, Evans Signal Laboratory director, who announced that the record was set on Sept. 28, pointed out that the greatest height ever attained by a balloon carrying human beings was 72,395 feet. That was accomplished in 1935 by Captains Albert W. Stevens and Orvil A. Anderson. The balloon that rose 140,000 feet carried only meteorological instruments.

The record-breaking balloon is made of neoprene latex and is approximately 17 feet in diameter at the time of release. It is only partially inflated when it leaves the ground and first becomes spherical at an altitude of about 35,000 feet.

The balloon expands as it continues its ascent, reaching a maximum diameter of approximately 75 feet, when it bursts.

Science News Letter, December 4, 1948

ARCHAEOLOGY-GEOLOGY

Discover Stone Age Tools On Former African Beaches

➤ **EARLY** Stone Age tools, used by prehistoric man, have been found at the former sites of beaches in Mozambique, Portuguese East Africa, indicating that the ocean may have receded 40 to 50 miles and dropped its level by 150 feet since Stone Age man first inhabited the continent.

Discovery of this geographical change was made recently by a group of University of California African Expedition scientists, including Prof. Gelal Awad of Farouk University, Alexandria, Egypt, and Dr. H. B. S. Cooke, South African geologist. The group was invited to Mozambique by the Portuguese government.

Expedition scientists, under the direction of Wendell Phillips, also found a number of new types of fossil marine shells, some of them laid down on the beds of dried-up seas for as long as 80,000,000 years.

Importance of the discovery of sea level changes in the area is that it will yield valuable geographical information for future studies of the relation between man and his physical environment on this part of the continent.

Science News Letter, December 4, 1948

AERONAUTICS

Berlin Airlift Will Be Aided by Krypton Lights

➤ **THE BERLIN** airlift, bringing food to the city's population, will soon be aided by krypton gas approach lights at seven airports, it was revealed by Westinghouse, developer of this type of light which is visible through a thousand feet of dense fog.

A six-light system will be installed at each of these seven landing fields, which include the Berlin Tempelhof Airdrome. The first two sets of six lights each will be delivered to the Air Force within 60 days.

Each of the new lights, containing the rare gas krypton found in the atmosphere, will have a brilliance of more than 3,000,000,000 beam candlepower. The six lights in each system will flash one after another in the wink of an eye and appear to a pilot as a flash of lightning. This European installation is intended primarily to help pilots locate the landing fields in spite of bad weather.

Westinghouse krypton lights were given their first airport test on a Cleveland field. The first commercial installation is the system at New York's new International Airport. A system including 35 of these krypton lights is already undergoing testing at the Landing Aids Experiment Station, Arcata, Calif., said to be the foggiest spot in the nation.

Science News Letter, December 4, 1948

TYPOGRAPHY

Printing Gets "New Look"

A machine which may outmode movable type and high-speed presses that may be able to print in six colors are some of the promising advances ahead.

By WATSON DAVIS

➤ THE PRINTED WORD, so important in keeping you up-to-date on news of the world or entertaining you, is getting a "new look" to those expert in the technical processes of printing.

The pages of this magazine or other printed material are not likely to look markedly different in coming months. But a tremendous spurt of experimentation in printing methods and apparatus is taking place behind the scenes.

It is a big leap from Gutenberg to the high-speed rotary newspaper press. Gutenberg in the 14th century is credited with inventing movable type.

One advance in the next few years is likely to outmode the movable type, whether set by hand or by machine. It is composing by photography.

Several photocomposing machines are in experimental use and one company known for typesetting machinery has its photocomposer in day-by-day use in several large plants.

Photocomposing Machines

Usually these photocomposing machines will be used to set up material for lithographic printing. Lithography has come a long way from the days when an artist drew pictures directly on a special stone from which copies could be made by use of the fact that ink would stick to the markings and not to the stone. Lithography is now generally done from a metal plate on which the reproducing images are placed by photographic processes.

The new photocomposers are useful because usually type matter to be lithographed has to be set with ordinary type and then a proof pulled which must be photographed as a negative in order to transfer the image to the lithograph plate. These additional steps for getting words into lithographic copy impose a burden upon the process.

Photocomposers would make negatives directly and these could be used for making plates for lithography—for rotogravure or for line engraving that can be printed on ordinary presses—what is called letterpress.

In the Government Printing Office in Washington, one of these photocomposers is at work and it has been used on various jobs, including a series of guides for the National Parks. This machine is the Intertype Corporation's Fotosetter. Other such

machines are in experimental production or use.

A new kind of high-speed press is being developed with the idea of using electricity to entice the ink from the plate to the paper, without the paper and printing even coming into wearing contact. This "electronographic" press of the Huebner Laboratories is in pilot press stage, but many printers are excited about it because it may be able to print in six colors on both sides of a roll of paper at the same time—bringing color at high speed to newspapers and long-run magazines.

With color invading the printing processes at a great rate, another new device is an apparatus that matches colors electronically in making the printing plates by various processes.

In Chicago for many months the newspapers have had a different appearance because the compositors who run the typesetting machines have been on strike. The newspapers have been getting around this lack of typesetting by making photoengravings of typewritten copy, much as they

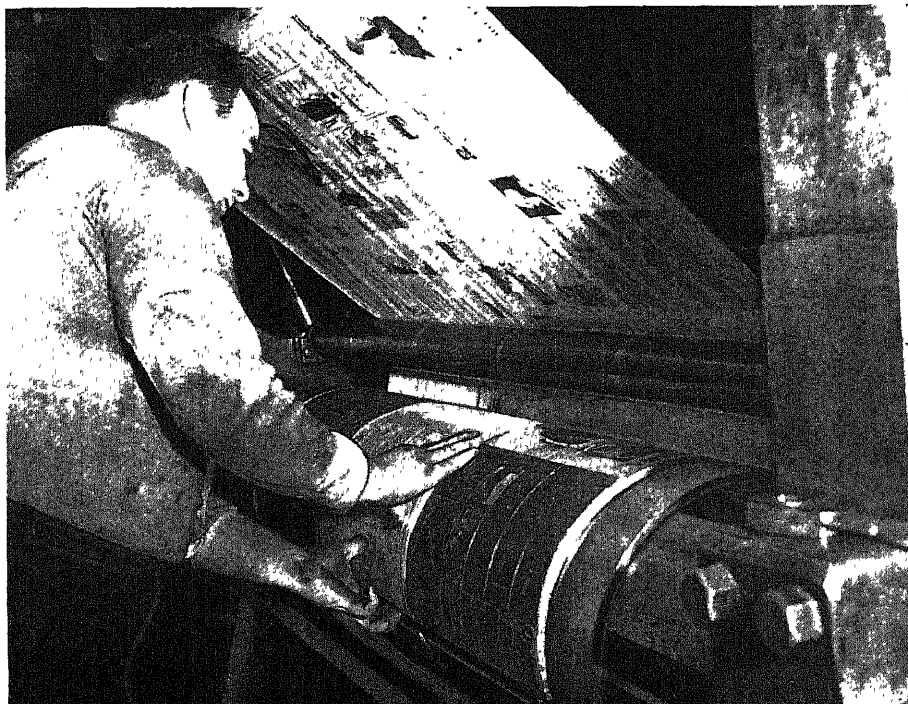
normally reproduce from drawings and photographs the illustrations of the newspaper. This typeless printing short-circuits the linotype and intertype composing machines necessarily idle because of strike. Everything else—plating-making presses, etc.—is the same.

This emergency method, which has focused attention on printing technology as never before, is really not anything new. It was used by the old Literary Digest magazine nearly 30 years ago when its typesetters were on strike. It was used a little later in London and Paris for a similar reason. Within the past year its use in this country has greatly increased.

Typeless Printing

The Literary Digest typeless printing job was merely photographic reproductions of typewritten pages made with ordinary typewriters. It opened the eyes of publishers to a possibility of a printing method perhaps better than that used for long years. It also interested inventors in developing special typewriters for the purpose and better and more rapid methods of electroengraving.

In early ordinary printing tiny rectangular strips of metal, with a letter in reverse on the end, were assembled by hand in proper order in a form from which the



WHIRLING PRESSES—This high-speed rotary newspaper press marks centuries of progress since Gutenberg who is credited with inventing movable type.



PHOTOCOMPOSING — Machines, called *photocomposers*, make negatives of the material desired which are then used for making plates for lithography. Here a series of guides and other publications were produced by this method.

printed matter was made. This process is still used to a certain extent but is too slow and costly for printing in quantity.

SCIENCE FILMSTRIPS

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VISUAL SCIENCES

599-S

SUFFERN, N. Y.

Most type is now set by such machines as the linotype which produces type cast in lines or bars.

The hand-set or linotype-cast bars of type are set in frames in a printing press. Ink is applied to the face of the type. Then the paper to be printed is pressed against it. However, if many copies are to be printed, lead casings called stereotypes are made of each page. These can be used on the rollers of high-speed rotary presses.

The typesetting trade is as old as printing itself. It is not to be expected that no typesetters will be needed in the future. Newspapers and other printing plants have huge investments in giant typesetting machines. However, new printing companies will certainly study the new process and may decide to use typists instead of typesetters. And as the giant machines become worn out in old plants, some of them may never be replaced.

One problem encountered in using ordinary typewriters for newspaper work is to arrange the reading material in lines of equal length and in columns perfectly aligned on the right as well as the left side. In ordinary typesetting this may be accomplished with inserts to widen the spaces between the individual types or between separated words. In the ordinary typewriter there is no way of spacing letters farther apart, but greater space may be put between words.

Justified Copy

Justified copy is the printer's term for properly columned type. Justifying typewriters are relatively new typing machines which can be used to produce justified copy. There are several on the market and others in the testing stage. Some of them will permit the changing of type face or size. Some have type especially designed for newspaper work, producing copy that resembles closely the familiar printing type. Some have provisions for an improved spacing of letters, with more space for wide letters and less for the thin ones. This provides easier reading.

After the justified copy has been typed, it must be assembled into pages. The columns are pasted on a make-up cardboard sheet the size of which depends upon the

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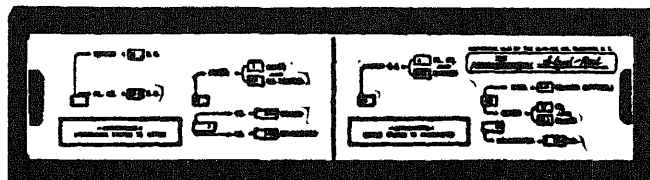
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size of the page to be printed. This form page is photoengraved on metal, and stereotypes made from the engravings. These are placed in the rotary press. The proposed, and partly in use, printing process has advantages and disadvantages of course. One appeal to printers is a probable saving in printing costs. Ordinary typists with a little special training can operate the justifying typewriters, and typist wages are only about one-half of that paid members of the International Typographical Union. There is a similar reduction in make-up costs, and new devices for electro-engraving can be operated with personnel of only a few days training.

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There are several devices which permit the use of regular linotype machines by ordinary typists. One is a typewriter keyboard attached to the keyboard of the linotype which, instead of producing ordinary typing, operates the linotype producing the same cast lines which the trained linotype operator would produce.

Then there is the teletypesetter which has been in use for some time. These machines have typewriter keyboards, and when used produce a tape with perforations that represent letters and punctuation marks. This tape is then put in a special device on a standard typesetting machine, and automatically controls the operation of the machine to produce cast bars of printing type.

This device is used for operating typesetters at a distance from the office where the perforated tape is made. Electrical impulses sent with its use operate typesetters in distant cities where copies of publications are printed to save time and cost in distribution.

The Vari-Typer, made by Ralph Coxhead Corp., New York, is a semi-automatic justifying typewriter with interchangeable type faces, includes several hundred sizes and styles. In use, two manual typings of the material are necessary. The matter to be printed is first rough-typed with the vari-typer itself, or with an ordinary typewriter, on the left side of a sheet, justified as far as possible. The typed sheet is then put in the

justifying machine, or if it is already in it the carriage is moved to the left. In retyping each line, the machine automatically justifies it.

Typeless printing may be said to be in an experimental stage but its future is definitely promising. The printing industry is watching developments closely. The newspaper business is keenly awake to its possibilities and will not let others surpass it.

Science News Letter, December 4, 1948

ENGINEERING

Gas Turbine Locomotive Is Undergoing Tests

➤ NEWEST development in locomotives is under test by the American Locomotive Co. and the General Electric Co. in Erie, Pa.

The first gas turbine-electric locomotive to be built and operated in this country will be operated on a demonstration basis by the Union Pacific Railroad next summer. This locomotive is now fired by oil, but engineers hope it will lead to a successful coal-burning gas turbine.

Science News Letter, December 4, 1948

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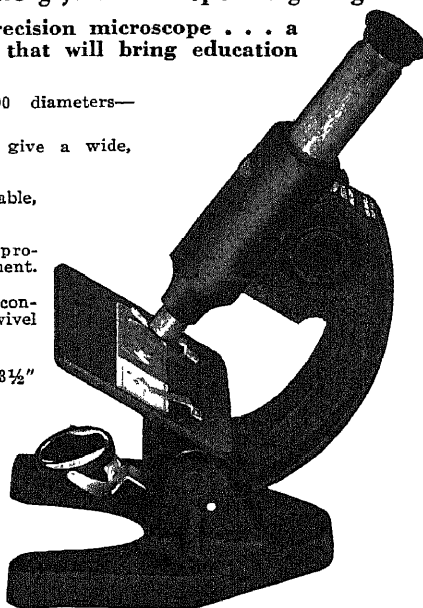
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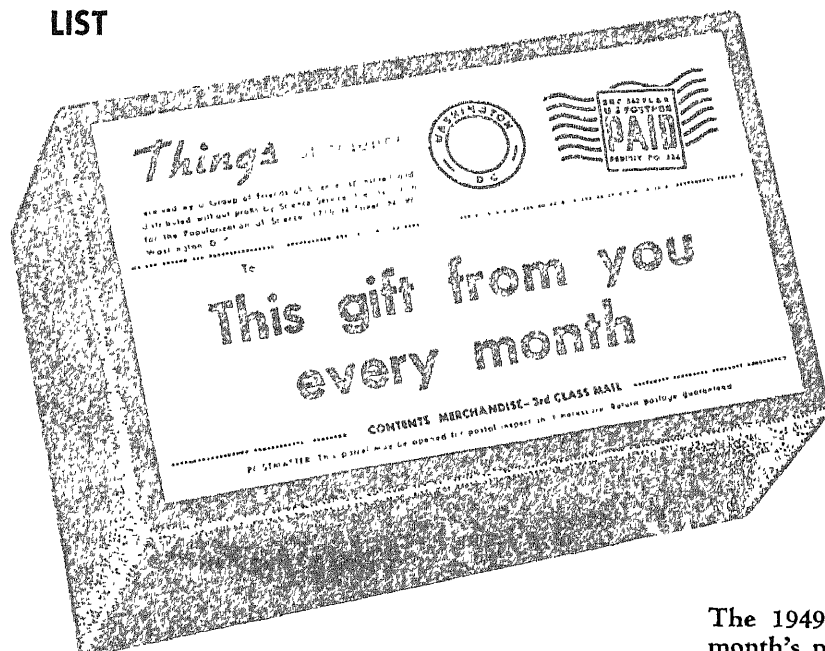
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Since late in 1940, packages like these have been going forward to members of the THINGS of science group. Glance over this list, then decide whether a membership which brings monthly packages on subjects as widely varied as these, isn't just the thing for that most unusual person on your Christmas Gift list.

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Meteorites	Spices	Corn
Fossils	Sweetness	Lecithin
Vitamins	Volcanic	Vegetable Dyes
Insects	Steel	Housing Materials
Mineral Optics	Coal Byproducts	Tree Products
Plant Hormone	Coffee	Phosphorescence
Unusual Fabrics	Nylon	Dry Cell
Plywood	Sound Recording	New Flower Seeds
Oyster	Home & Office	Electronics
Lodestone	Tricky Minerals	Coffee Byproducts
Rayon	Glass Lens	Cellulose Plastics
Coins	Rope	Specialized Textiles
Felt	Plastic-Coated Yarns	Fungicides
Casein	Insecticides	Impregnated Paper

You know the one who would thank you again and again for such a gift. And if you are not yourself a member, you could hint to someone that you'd like it as a gift yourself.

The 1949 THINGS of science will be unusual; every month's package will be a surprise. A Christmas Membership to THINGS of science will bring the 12 units of 1949, plus an extra unit which we will select and add to your gift with our compliments, to arrive in time for Christmas. We will make out and mail a Christmas card with your name as donor, announcing your gift. Each membership is \$4 a year, postpaid. You will find a handy order coupon below.

T-308

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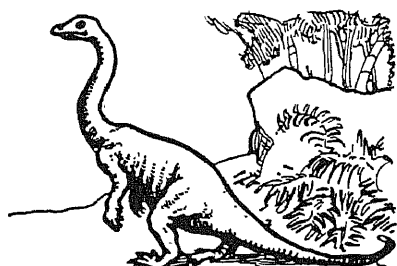
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Meek Inherit The Earth

➤ **BIG THINGS** can evolve out of little ones, but not little things out of big ones.

The whole course of evolutionary history is littered with examples of developmental lines of animals and plants that started small, grew big, then huge, and then—died. Faced with changed and adverse conditions, they apparently could not contract the scale of their operations to weather the storm. They could only go into involuntary bankruptcy and pass out of the picture.

It was so with the dinosaurs. The earliest reptiles, in the age that succeeded the lush days of the coal era, were moderate-sized beasts. The biggest of them did not out-rank modern crocodiles or the giant tortoises of the Galapagos. In succeeding geologic periods, one reptilian line, the dinosaurs, began to take on size; first as big as a horse, finally as big as a house. Then came one of the world's periods of major geologic change—a revolution—and down

went the dinosaurs. The reptiles that survived and now possess their modest share of the earth were the less ambitious, less grandiose orders—lizards, tortoises and turtles, crocodilians, and the later-appearing snakes.

The same is true of the giant plants that lived in the coal age. They were, some of them, relatives of the common horsetail rushes that now grow along railway embankments and in moist sandy soil. They aspired to great heights, developed into things as big as the giant cacti of our Southwest. But when geologic hard times came they couldn't "take it," and so passed out, leaving their share of the picture to their poor relations, the smaller horsetails, that somehow managed to struggle through not only those hard times but all that followed, and are still with us.

The same story could be told about a

dozen families of mammals, that appeared on the scene much later. Elephants will do as a type example. The earliest ancestral elephants we know anything about were animals not much bigger than a pig, without the great trunk and tusk development that came later. They grew and grew in succeeding geologic periods, until just prior to and during the last great glacial epoch they reached their climax in beasts more than a dozen feet high at the shoulders, with tremendous curved tusks. But they all went, with the exception of the two surviving species in Asia and Africa. And these, even without the deadly interference of man, must surely have followed their forefathers before many more thousands of years.

The meek always inherit the earth—and when they cease to be meek they presently lose it again.

Science News Letter, December 4, 1948

GEOLOGY

Earth's Record in Rock

➤ **GO TO** the bottom of the sea. Punch a hole a hundred feet deep. You can then bring up to the surface a core of rock and mud that will record the whole long history of the earth, two billion years or so of geologic time.

Dr. Maurice Ewing, Columbia University geologist and oceanographer, who has this summer probed the floor of the Atlantic, told the National Academy of Sciences meeting in Berkeley, Calif., that this is a possibility.

The longest core yet captured by Dr. Ewing is 37 feet from the floor of the Atlantic, but Swedish scientists have one that is 60 feet long. Dr. Ewing predicted

that a hundred foot sample, less than formerly believed to represent the sediments since the beginning of earthly time, can be obtained in the near future. Microscopic fossils in the earth cores give valuable new clues to our picture of the earth.

Dr. Ewing also stated that the depth of granite bedrock, lying under the ocean mud, can be determined by the explosion of depth charges under the surface. The refraction, or echo, that follows the explosion can be used to determine the depth and nature of the bedrock. Such measurements, in the mid-Atlantic, have shown a granite layer 40,000 feet thick, under which lies basalt rock.

Science News Letter, December 4, 1948

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BATHOLITH AND ASSOCIATED ROCKS OF CORONA, ELSINORE, AND SAN LUIS REY QUADRANGLES SOUTHERN CALIFORNIA—Esper S. Larsen, Jr.—*Geological Society of America*, 182 p., illus., \$4.50.

BOY'S BOOK OF SNAKES: How to Recognize and Understand Them—Percy A. Morris—*Ronald*, 185 p., illus., \$3.00. How to catch them and how to feed and care for them as pets. Also an account of those you are not likely to see except in zoos.

CONTRIBUTION TO THE BIOLOGY OF THE PHILIPPINE ARCHIPELAGO AND ADJACENT REGIONS—Theodor Mortensen—*Govt. Printing Office*, 47 p., paper, 30 cents.

CRUCIBLES: THE STORY OF CHEMISTRY: FROM Ancient Alchemy to Nuclear Fission—Bernard Jaffe—*Simon and Schuster*, Rev. ed., 480 p., \$3.95. Human interest stories in chemistry from Trevisan to Lawrence.

DESIGN OF INDUSTRIAL EXHAUST SYSTEMS—John L. Alden—*Industrial Press*, 2d ed., 252 p., illus., \$3.50. Instructions for designing, building or buying.

FINDINGS AND RECOMMENDATIONS OF THE PHARMACEUTICAL SURVEY 1948—*American Council on Education*, 49 p., illus., paper, \$1.00. Recommending, among other things, the in-service training of pharmacists.

FREEDOM FROM WANT: A Survey of the Possibilities of Meeting the World's Food Needs, A Symposium—E. E. DeTurk, Ed.—*Chronica Botanica*, 283 p., illus., paper, \$2.00. In a foreword, the director-general of FAO says, "It looks very much as though the road along which the human race is driving right now leads to a dead end—and I mean dead. But I would not agree that this is the only road mankind can follow." This book points out a new way.

THE FREEZING OF SUPERCOOLED WATER—N. Ernest Dorsey—*American Philosophical Society*, 81 p., illus., paper, \$1.75. A technical report by a Bureau of Standards expert.

HEALTH PROGRESS 1936 TO 1945: A Supplement to Twenty-Five Years of Health Progress—Louis I. Dublin—*Metropolitan Life Insurance Company*, 147 p., illus., paper, free upon request to publisher by those interested in the advance of public health. An interesting account of the battle against disease.

ILLINOIS CONFERENCE ON INDUSTRIAL RESEARCH—*Amour Research Foundation*, 68 p., paper, \$1.00. Proceedings of a meeting at the Illinois Institute of Technology, May 27-28, 1948.

LAMBERT'S HISTOLOGY: An Introduction and Guide—Revised by Helen L. Dawson—*Blakiston*, 2d ed., 696 p., illus., \$6.00. Text for beginning students beautifully illustrated with photomicrographs, many of them in color.

LIPPINCOTT'S HANDBOOK OF DENTAL PRACTICE—Louis I. Grossman, Ed.—*Lippincott*, 417 p., illus., \$12.00. A guidebook for the practicing dentist, including much new material.

MINERALS YEARBOOK 1946—Allan F. Matthews, Ed.—*Govt. Printing Office*, 1629 p., illus., \$3.75. Publication of this volume of statistics was delayed by reductions in staff and increased number of special assignments in connection with the Marshall Plan and other matters.

ORGANIC CHEMISTRY—Hugh C. Muldoon—*Blakiston*, 3d ed., 648 p., illus., \$5.50. Text for beginners rewritten to include much new material.

PROFESSIONAL OPPORTUNITIES IN THE WILDLIFE FIELD—David B. Turner—*American Nature Association and the Wildlife Management Institute*, 208 p., paper, \$1.00.

REGULAR POLYTOPES—H. S. M. Coxeter—*Methuen*, 321 p., illus., \$10.09 approx. For mathematicians and enthusiasts on mathematics. If you are curious about the mathematics of the familiar toy, the kaleidoscope, you will find much to your taste here.

REPTILE AND AMPHIBIAN TRACKWAYS FROM THE LOWER TRIASSIC MOENKOPF FORMATION OF ARIZONA AND UTAH—Frank E. Peabody—*University of California Press*, 467 p., illus., paper, \$3.50. Study of the trackways has provided much information about animals long extinct.

THE ROLE OF SCIENTIFIC RESEARCH IN HUMAN RELATIONS—William A. Hamor—*Mellon Institute*, 4 p., paper, free upon request direct to Mellon Institute, University of Pittsburgh, Pittsburgh 13, Pa.

SCIENCE AT WAR—J. G. Crowther and R. Whiddington—*Philosophical Library*, 185 p., illus., \$6.00. Written by a team of well-known British journalist and physicist, this tells the story of the contribution of British science toward winning the war.

A TREASURY OF SCIENCE—Harlow Shapley, Samuel Rapport and Helen Wright, Eds.—*Harper*, enlarged ed., 272 p., \$4.50. Selections from well-known writers especially for the general reader. The new edition contains an extension of the selection from Jeans on "Exploring the Atom" as well as some new contributions on atomic energy.

YOU MUST RELAX: A Practical Method of Reducing the Strains of Modern Living—Edmund Jacobson—*McGraw-Hill*, 3d ed., 282 p., illus., \$2.75. Understandable instructions on how to get rid of nervous and muscular tensions when you are "keyed up."

Science News Letter, December 4, 1948

PHYSICS TELLS WHY

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A simply written, interesting book, taking up the basic principles underlying such subjects as Radar, Stratosphere, Aviation, Ballistics, Television, and Polarization. It will be found to be of especial value as a textbook in classes where the aim is to present an easily understandable picture of the part physics plays in our daily lives. 387 pages, \$3.75

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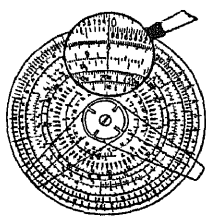
Especially designed for the nonmajor course and the science survey course. Aim is to present material that will make generally clear those theories that serve present-day chemists for explaining the nature, properties, and behavior of matter in its several forms. 310 pages, \$3.00

PRINCIPLES OF PHYSICAL GEOLOGY

By ARTHUR HOLMES

A text for beginning courses in general geology on the college level. The method of treatment adopted is one that twenty years' experience has shown to be successful in training students, in holding and developing their interest. Includes great discoveries of the past as well as the many new discoveries. 532 pages, \$4.50

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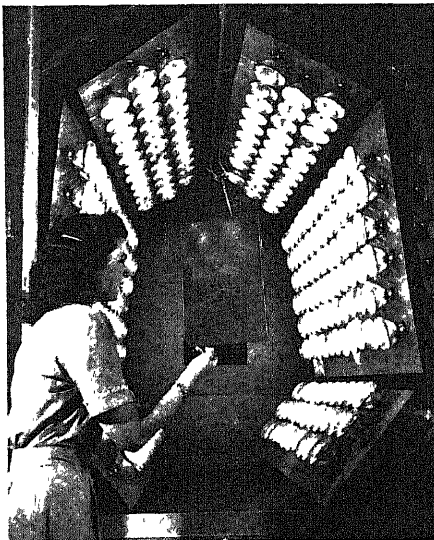
⚙️ **HAND TOOL**, operating with blank cartridges, drives metal studs into wood, concrete or steel with a great saving in time over former methods. The cartridges are fastened to the end of the studs, which become imbedded so solidly that they will support a weight of several tons, it is claimed.

Science News Letter, December 4, 1948

⚙️ **HOLDING TAPE**, to hold a man's shirt inside his trousers or a woman's blouse within her slacks, is a strip of neoprene sponge rubber with a backing of cotton tape so that it can be easily stitched inside the waistband. This synthetic product does not soften and become sticky from perspiration and body oils.

Science News Letter, December 4, 1948

⚙️ **TEST OVEN**, combining the advantages of both infrared and convectional heating, was developed to establish standards for the baking of organic finishes and to discover new uses for infrared heating. As shown in the picture, the infrared lamps are arranged in six adjustable banks



with regulators to allow variation in the voltage used.

Science News Letter, December 4, 1948

⚙️ **ASPHALT** removed quickly and effi-

ciently digs out, by a revolving cutting wheel, old asphalt from expansion joints in concrete paving. Guided by plow handles, the rubber-tired, gasoline-power device has exchange cutters for joints of different widths, and it has a pick-up unit to gather the waste material.

Science News Letter, December 4, 1948

⚙️ **PHOTOCOPY** finishing equipment, made of hard rubber and fitted with a lid, puts an end to the bother of mixing chemical solutions, then storing them again every time after prints are made. Solutions may remain in these tanks for months, protected from light, dust and evaporation by the lids.

Science News Letter, December 4, 1948

⚙️ **TWO-WAY** communication set, developed in England, allows a mother to work indoors and hear the baby in an outdoor playpen. It operates from two ordinary flashlight batteries, and is worked by pressing a lever to speak and releasing it to hear. The portable receivers are placed one near mother and one near the child.

Science News Letter, December 4, 1948

• Do You Know? •

Spareribs and sauerkraut are as American as baked beans.

American farmers are spending three times as much now for medical care as they were a decade ago.

High-strength copper alloys include manganese bronze, silicon bronze, and certain so-called white brasses sometimes called nickel silver.

A small amount of calcium chloride, added to the water in which apple slices are soaked prior to freezing or canning, makes slices that retain their shape and firmness when baked in pies.

An ancient city in Colombia, South America, recently excavated, had over 3,000 houses, according to the foundations unearthed; it was inhabited until shortly before the Spaniards came to the continent.

Scientists have resorted to blowing soap bubbles in an effort to find out what makes metals strong; soap bubbles have proven more useful than anything else tried in constructing a working model of a metal's crystal structure.

Several copper-base alloys have been developed that have an ultimate tensile strength rivaling that of steel.

A manganese shortage in poultry feed is said by poultry men to result in eggs of low hatchability.

A collection of some 2,000 butterflies from the remote Nyasaland region of Africa has been presented to the American Museum of Natural History, New York.

Rubber reclaiming, for reuse, is a big business in America; some 300,000 tons of the salvaged material are consumed in the United States each year.

In 1874, just 15 years after the first oil well was drilled in America, a Pennsylvania scientist estimated that the United States had enough petroleum to keep its kerosene lamps burning for only four years.

An all-aluminum bridge 504 feet from abutment to abutment is under construction in Quebec, Canada, which, it is said, will weigh 2,000 tons less than a similar bridge of steel; some bridges already in use are in part aluminum.

In 1947, coffee ranked first in value among imports into the United States, accounting for more than 10% of the total value of imports.

Sixteen Navy Seabees are spending the winter at Point Barrow, Alaska, living in a new type of prefabricated house designed to provide summer warmth in 65-below-zero weather and to withstand 150-miles-per-hour gales.

Science News Letter, December 4, 1948

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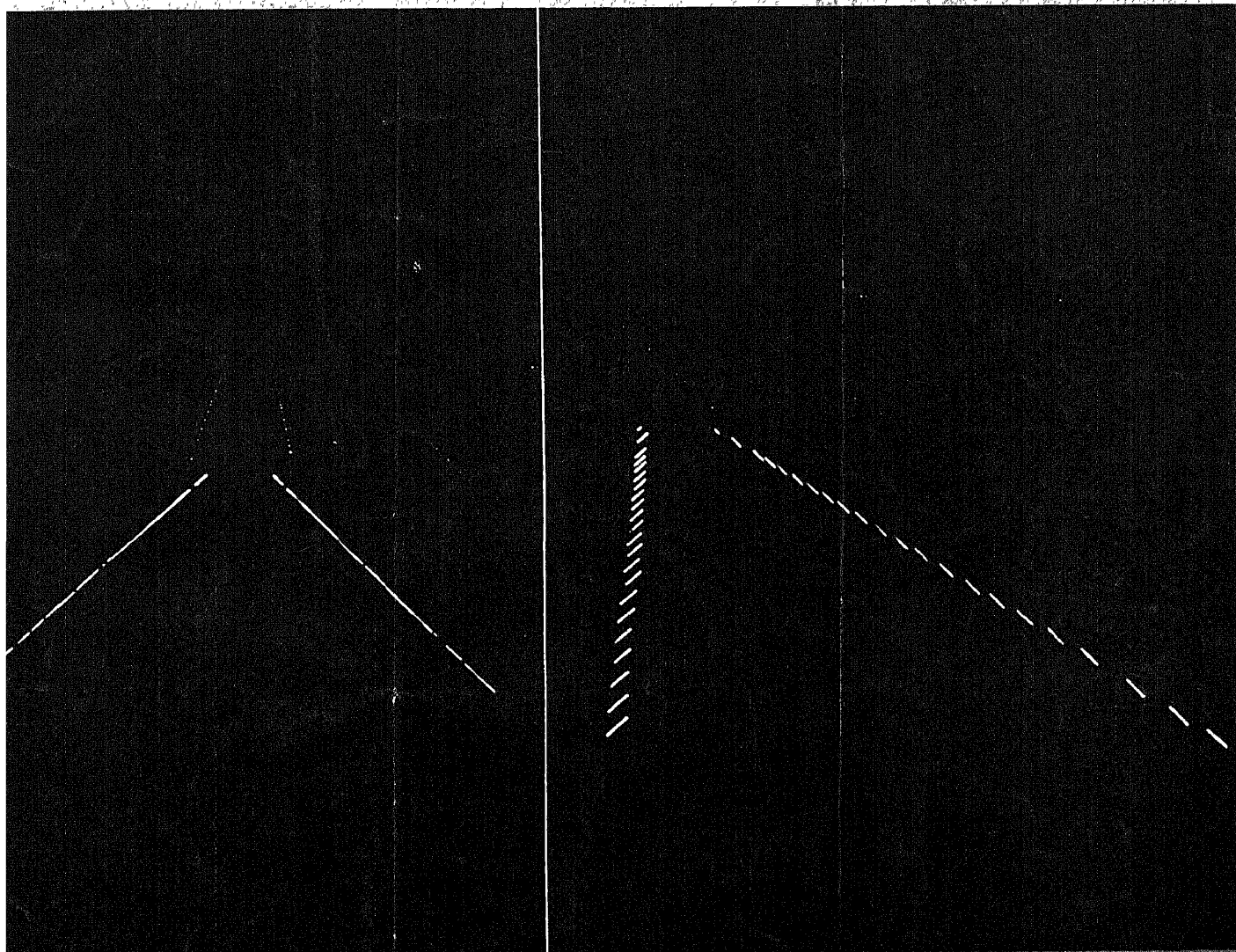
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RADIO

Radio Can Gage Radiation

By adding a low-voltage Geiger-Mueller tube to your home or car radio you can use it as a detector of radioactivity in event of an atomic attack.

➤ YOUR HOME or car radio can be used to detect the deadly radiations from an atomic bomb explosion. The only change required in most home radios—adding a detection tube—is so simple that you can probably do it, following simple directions.

How your radio can be converted into a radioactivity detector is described in a report by an atomic scientist, William D. Schafer. The report has just been declassified by the U. S. Atomic Energy Commission.

A low-voltage Geiger-Mueller tube, used in the famous Geiger-Mueller counters for detecting radiations, can be installed in your radio, the report explains. The tube can be installed in your home radio for detecting radiations and easily removed for listening to broadcasts.

In event of an atomic disaster in which radioactive clouds contaminate large areas, the home radioactivity detector would indicate the presence and intensity of contaminating radioactive dust by clicks or roars from the radio's loud speaker. The warning clicks might warn a family in time for escape to a shelter that is less radioactive.

You could easily check to see if your home radio-detector was working by holding a radium watch dial near the set. If the detector was working, even the tiny amount of radiation from a watch dial would cause

a few clicks per minute in the loud speaker.

A special low-voltage Geiger-Mueller tube is necessary for the home radio-detector, because your radio ordinarily has no more than 300 volts in its circuits. Laboratory G-M counter tubes require 600 to 900 volts for correct operation. But the low-voltage tubes have been developed. They could be mass-produced, the report declares.

In the simplest home detector, all that is needed is a low-voltage G-M tube and a special tube socket adapter. One of the tubes is unplugged and the adapter inserted instead of the tube socket. Removing the adapter and replacing the tube would again permit you to hear broadcasts.

In addition to serving as a detector of radiation in event of an emergency, your car radio might be used in prospecting for radioactive mineral deposits. Standard batteries would be used to give a high-voltage supply for the car radio-detector.

Three methods of making your radio perform as a radioactivity detector are described in the report. One, best adapted to car radios, would be the more expensive.

Big advantage of the new system is, of course, that most families have radios. Now, the report indicates, if you have a radio you can also have a relatively simple but effective detector of radioactivity.

Science News Letter, December 11, 1948

MEDICINE

Medical Aid from Lemon

➤ A CHEMICAL from lemon peel may be an aid in overcoming the blood damaging effects of radiation injury, whether from atom bombs, through accidental exposure or in cancer treatment, it appears from experiments by Drs. William G. Clark, Rex P. Uncapher and Mary L. Jordan of the Scripps Metabolic Clinic and Scripps Memorial Hospital in La Jolla, Calif.

The lemon peel chemical given to guinea pigs in their drinking water cut the mortality of the animals by about half when they were exposed to total body irradiation from X-rays, the scientists report in the journal, *SCIENCE* (Dec. 3).

An X-ray dose that killed 30 out of 45 untreated animals killed only nine of 26 that had been given the lemon peel chemical. The hemorrhagic symptoms of the treated animals were considerably less marked than those of the untreated.

The lemon peel chemical used is calcium flavonate, a substance like vitamin P. Its value for cancer patients would be that with it they could safely be given larger doses of X-rays in treatment.

Further practical advantage of the research is that it seems to show that smaller laboratory animals than the dog can be used in studies of this sort.

Science News Letter, December 11, 1948

CHEMISTRY

Shine Taken from Pants by Permanent Waving Fibers

➤ THE SHINE can now be removed from pants or skirts by putting a permanent wave in the fibers.

A new acid-and-abrasive-free liquid preparation that removes the shine from clothing

without injuring the fabric has just been made available to dry cleaners by the Vitatex Products Corporation of New York.

The fluid, sold under the trade name Killshine, works on the same principle as cold permanent wave lotions. When applied to the shiny area of a piece of material, its chemical action temporarily softens the tiny fibers which normally form the nap. These fibers, now pliable, are brought back to their original position by brushing. Thus the nap is restored and the shine killed.

On fabrics that have no nap, shine usually results from a flattening of the fibers that make up the material. Killshine temporarily softens these fibers and brushing restores them to their original shape, thus killing the shine.

Science News Letter, December 11, 1948

GEOLOGY

U. S. and British Atoll Borings To Be Compared

➤ HOW OLD is an atoll?

This still-vexed question may be brought closer to solution at the U. S. National Museum through the arrival in Washington of two tons of rock from the British Museum. The rock consists of cores cut by a hollow drill that bit 1,100 feet down into the substructure of the British-held atoll of Funafuti, a half-century ago. These cores will be compared with similar cuttings made since the war at Bikini atoll.

As of now, there seems to be a wide discrepancy between the ages of the two sets of rock samples. The Funafuti cores were estimated to be not more than 25,000 years old when they were first examined; those from Bikini have been assigned an age somewhere between 10,000,000 and 15,000,000 years. A re-examination of the British material may indicate that the first estimate on its age was too low. However, there seems to be considerable difference between the mineralogical makeup of the rock samples from the two atolls, which lie 1,500 miles apart in the Pacific.

Negotiations for the loan from the British Museum were conducted by Dr. John W. Wells, Cornell University geologist.

Science News Letter, December 11, 1948

ASTRONOMY

Astronomer Finds Fifth New Comet in Three Years

➤ A FIFTH new comet in three years is being credited to Michiel J. Bester, young astronomer at Harvard's South African station.

Mr. Bester's latest discovery is too far south to be seen by American observatories and too faint to be seen without binoculars or a telescope.

Tentative name for the new comet: Bester Five.

Science News Letter, December 11, 1948

AERONAUTICS

New Lighted Guide Path

Fliers will know when they are on the glide path in this slope-line system, as it is called, by the appearance of the lighting units.

See Front Cover

➤ A NEW lighted guide path known as the slope-line system, to lead in-coming pilots directly down to the end of a runway, has now been accepted by the highest federal aviation approval committee and is scheduled to become widely, if not universally, used at American commercial airports.

This slope-line system was developed by the Civil Aeronautics Administration, particularly by the late A. J. Sweet, and H. J. Cory Pearson and M. S. Gilbert. Already in use at the Indianapolis airport, where CAA's aviation experimental station is located, it will be installed very soon by CAA at eight other commercial landing fields. These are at Boston, Philadelphia, Nashville, Chicago, Houston, St. Louis, San Francisco and Seattle. Federal funds for these installations are now available.

This system in appearance differs from those generally in use. It is relatively simple. When first proposed, the idea was ridiculed as impractical, but it works, and is probably superior to any other known approach lighting scheme.

Other systems include two long rows of lights, often in V-shape with the apex at the landing end of the runway. This system is composed of a series of lighting units in V-shape but the lights in each unit are aligned at right angles with the approach path. And they disperse their beams forward in a wide angle, not vertically upward as other lights do.

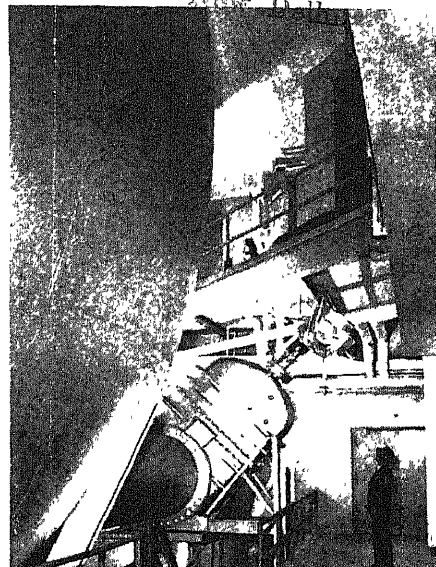
An approaching pilot, if directly on the

glide path, sees the lights as two almost continuous single lines, one to his right and one to his left. If not on the glide path, he sees broken lines arranged like the teeth on a saw. On the left side of the cover on this week's SCIENCE NEWS LETTER is shown the correct approach and on the right side the incorrect. This system not only provides him with two converging lines of light leading to the runway, but also gives him a glide path which he knows he is on by the appearance of the lighting units.

Each unit is made up of ten lamps in sealed-beam units similar to those used for headlights on automobiles. They are placed in an elongated box, 14 feet long, open to the front but not upward. The boxes and their lights are 100 feet apart, pointing inward, and at an angle of 45 degrees with the level earth. The glide path is the imaginary line connecting the intersection of these box-units with their opposite mates, if all were extended to meet like rafters on a roof over the center of the approach path.

If the lighting units were placed in parallel lines, this imaginary, apex-connecting line would be parallel to the ground. But they are not. At the outer end, they are perhaps 360 feet apart, and at the runway end, about 96 feet from each other. The result is that the imaginary line is much higher in the air at its outer extremity than near the runway. The lights must be so placed that the glide-path line approaches the landing strip at the proper slope for safe landing.

Science News Letter, December 11, 1948



QUINTUPLE SPEED OF SOUND
—the wind tunnel shown above, in which the remarkable air speed of more than five times the velocity of sound was obtained recently, is a modernized captured German supersonic tunnel now at the Naval Ordnance Laboratory, White Oak, Md. The high speed, equivalent to 3,960 miles per hour at sea level at ordinary temperatures, was obtained under a temperature of 377 degrees below zero Fahrenheit, in a 16-by-16-inch working section of the tunnel. The achievement is a world record for tunnels this size.

by Prof. Raymond A. Dart of Johannesburg that fossil remains of the creatures named *Australopithecus prometheus* represented a race of small, gracefully built ape-men weighing about a hundred pounds apiece, who knew the use of fire and of weapons and were in general much more human than they were first credited with being. (See SNL, Oct. 30).

The giant race will be known as Swartkrans Man, from the name of the cave where the jawbone and teeth were found. Age of the fossils is at present uncertain; estimates run from one-half million years to four million years.

Dr. Broom radioed to Wendell Phillips, leader of the University of California African Expedition who is now in Berkeley to report on the expedition's first 14 months of field operations: "On evidence to date, we can say that the new-type ape-man is larger than those previously known, that these ape-men are like man and were probably ancestral to him, and that they are not closely related to living apes."

Science News Letter, December 11, 1948

PALEONTOLOGY

Giant Ape-Man Fossils

➤ GIANTS as well as pygmies were among the weird population of ape-men who prowled South Africa's veldt in the dim geologic age before the emergence of man himself. Evidence for the existence there of a huge near-human being that was twice the size of a modern gorilla but much more man-like was reported to the University of California from one of the field parties of its African Expedition, by Dr. Robert Broom of the Transvaal Museum, who joined the University of California group last September.

Dr. Broom's find consists of the greater part of a lower jawbone containing three

premolars and four molars, together with a separate lower wisdom-tooth, two upper incisors and one upper eye-tooth. All the teeth are gigantic, slightly larger than those of the giant Java man, *Meganthropus*. A man proportioned to match the dimensions of the teeth would have to be two and one-half times as big as an average human being and at least double the size of a present-day gorilla. Yet the teeth are definitely human in shape, not gorilline. In this they resemble the giant teeth from Asia.

Discovery of this race of giant ape-men comes on the heels of the announcement

PHYSIOLOGY

Pins-And-Needles Feeling

➤ WHEN YOU FEEL "pins and needles" such as a foot or arm "going to sleep" after the blood supply to a nerve has been stopped and then restored, the number of pricks you feel and their intensity depend on the length of nerve recovering from the depressed blood supply.

Evidence for this view, which is contrary to those held by some other scientists, is reported by Dr. G. Gordon of Oxford University to the scientific journal, *NATURE* (Nov. 6).

The pins-and-needles sensation can be brought on by binding a cuff tightly around the arm, as a doctor does in taking blood pressure readings, and then releasing the cuff. Some scientists have thought the region of the nerve lying under the cuff was responsible for the sensation. Others held it was due to stimulation of a proportion of the outer nerve endings in the area in which the sensation is felt.

Dr. Gordon in his experiments produced the pins-and-needles sensation by putting a blood pressure cuff around the arm just above the elbow, thus cutting off the blood supply to the forearm and hand for 12 minutes, and then releasing the cuff. But when he blocked the nerve at the elbow, just below the cuff, by injecting the anesthetic procaine, the pins-and-needles sensation was not felt at all. This, he says, must mean that the four- or five-inch stretch of nerve lying under the cuff cannot be the place where all or even a majority of the pins and needles feelings start.

When the chemical block is applied to the ulnar nerve branches in the hand, so that the skin is numb to the feel of a real pin prick, the pins-and-needles pricks are fewer and less intense but still felt. This, Dr. Gordon points out, argues against

the idea that the pins-and-needles feeling is due to stimulation of a proportion of the outer nerve endings, because the sensation is felt even when these nerves are blocked.

Blocking the nerve midway between the hand and the elbow causes the pins and needles to be far less intense than with a block in the hand.

From his experiments Dr. Gordon concludes that no part of a nerve is particularly concerned in generating the impulses that give rise to this form of pins and needles. The fact that the intensity and number of pricks are apparently due to the length of nerve recovering from lack of blood probably explains why the pricking of pins and needles is less intense when produced by a cuff at the wrist and very feeble indeed with a cuff around a finger.

Science News Letter, December 11, 1948

ENGINEERING-AERONAUTICS

Fuel Can Flow Steadily to All Engines in Plane Now

➤ FUEL will flow continuously and automatically from all tanks to all engines in a new flow system developed at Wright-Patterson Air Force base in Dayton, Ohio. The same system permits the refueling of all tanks on a plane from a single tank-truck.

It is an important life-saving and time-saving development. Many planes have crashed because existing fuel systems require pilots to switch tanks manually when the one being used is emptied. In this new system, fuel flows from all tanks to all engines without any action on the part of the crew. The fuel flows automatically by a

system of pumps and valves until all tanks are empty.

The re-fueling feature of the new system is also important. The famous B-29, for example, has 29 fuel tanks with 11 servicing points. Using conventional methods, it takes 13 men with four trucks 45 minutes to refuel this bomber. With the new system it can be refueled by one man and one truck in 30 minutes. The operation is safe because there is no chance of gasoline spillage, and the job can be done with the engines running if desired. Capt. David Samiran is responsible for its development

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AERONAUTICS

Airplane-Guidance Beams

Blanket of VHF radio beams will cover America soon from 409 transmitting stations. These omniranges will aid pilots in knowing their exact positions.

➤ AN INVISIBLE blanket of crisscrossing but distinct radio beams for airplane guidance will soon cover the entire United States. They will be the very high frequency type and will originate at 409 transmitting stations which the U. S. Civil Aeronautics Administration has just revealed it is erecting. With their aid, any pilot may know his exact position at any time.

In addition to these CAA stations, there will be others erected by the U. S. Air Force and the Navy. These two government agencies are planning on about 140 of them, but many will be outside the continental United States. Those at home will be at stations of the Armed Services not adequately served by the CAA system.

The air navigation system made possible by these new radio stations requires a new type of radio receiver in all planes. All types of commercial aircraft, and perhaps the majority of private planes, will be equipped with them by 1952, it is expected. Some of these very high frequency transmitting stations are already in use and commercial airliners are already provided with receivers. The new installation is to replace completely the older radio-guidance system which provided radio beams for pilots to follow, but provided only four courses.

This new type of radio range is called the omnirange. A more complete name is very high frequency (VHF) omni-directional range. It derives the title from the fact that each station sends out beams in all directions, or at least in 360 different directions one degree apart.

Being VHF, the beams are static-free and "line-of-sight" type. This latter means reception ordinarily requires a path between the transmitter and receiver uninterrupted by mountains and other obstructions. A plane in the air at high altitude can receive the transmitter signals at much greater distances than one near the ground.

Operating on the static-free VHF radio

band, the system permits a pilot to fly by watching a vertical needle on his instrument board instead of listening to blurred and wearying sound signals. The omniranges present many other advantages. Pilots can fly a course either toward or away from an omnirange in any direction. This makes the ranges equally useful on or off an established airway. The system permits traveling across country instead of following beams, where this is desirable.

Distance-measuring equipment (DME for short) when used with the omnirange permits far simpler and safer air navigation than was possible with the old-type four-course radio range and marker beacons. When a pilot tunes his DME at an omnirange site, a pointer on its dial shows him in miles his exact distance to that station.

The combination of omnirange and DME gives the pilot a means of knowing his geographical position at all times. From his omnirange indicator he can read his course to or from the omnirange station, and from his DME dial he knows exactly where he is along the navigation line. The combination brings air navigation close to ultimate simplicity.

Omniranges and DME are designed to make flying high above clouds safe and sure. They are navigation aids, not landing instruments. However, they help bring a plane to the neighborhood of its destination where landing instruments take over and bring the plane down through overcast, sufficiently close to the runway to enable the pilot to make a visual landing. The well-known Instrument Landing System provides the plane with a glide path followed automatically by a properly equipped plane; and precision beam radar, better known as Ground Controlled Approach radar, provides the pilot with voice information as to whether or not his plane is exactly on the glide beam.

Science News Letter, December 11, 1948

BOTANY

Bracket Fungus Wanted

➤ MUSHROOM-HUNTING would seem to be over for the year, now that autumn has faded into winter. But it needn't be, if you've a mind to be helpful to a scientist who needs one kind of fungus and needs it badly. He is broadcasting an appeal over the land for it.

His name is Dr. Robert L. Frank, and he does his research in the William Albert

Noyes Laboratory of the University of Illinois. He doesn't want mushrooms to eat. What he wants aren't exactly mushrooms, though they are closely related to mushrooms; they are one particular species of bracket fungi. They aren't fit to eat, not because they are poisonous but because they are so tough and woody that only a billy-goat could relish them.

One kind of bracket fungus, and only one, contains the thing that Dr. Frank is trying to get—a rare compound called polyporic acid, which he needs in his scholarly business. There isn't much of the acid to the ounce of the one-and-only bracket fungus that yields it at all, so he needs a lot of ounces. Hence the appeal.

The particular fungus needed belongs to the group known as the polypores, so called because their undersides are completely honeycombed with pin-sized pores or holes. The top surface is mainly smooth, though there may be some bumps and uneven spots. It is not divided into bands or zones, as many other bracket fungi are.

It is not a very big plant, as a rule; four inches long and three inches wide is about as big as it ever gets, and you may find specimens down to the size of your thumbnail. It is a thickish growth, with a definite bulge both above and below.

Color ranges from pale yellow to flesh-color or tawny copper. The whole body of the fungus has the same tint. When fresh, it is soft and fleshy, and is said to smell like anise. Even the dry specimens you will find in the woods now are likely to have a fragrance.

This species is to be found only on dead wood, usually of hickory, though also on poplar, maple, beech, some of the oaks, and a few other trees. It is easiest to hunt at this time of year, when the distractions of flowers and green leaves are out of the way.

In the botany books it is listed as *Polyporus nidulans*. A while back, it had its name changed so that you may find it listed in some of the older reference books



SOURCE OF ACID—This is what the sought-for bracket fungus looks like, viewed from beneath. The crucial test is to moisten it with a drop of ammonia. If it turns purple, you've got it.

as *Polyporus rutilans*.

There are a number of polypore species, some of which are much more abundant than this, which is the only one that is of any use to Dr. Frank. So it is important to get a proper identification on a specimen that might be it.

The crucial test, says Dr. Frank, is

quite simple: moisten your specimen with a drop of ordinary household ammonia. If it turns purple, you have the right species.

Dr. Frank says he will welcome anything from a single specimen up to several pounds, and will gladly refund shipping charges.

Science News Letter, December 11, 1948

CHEMISTRY

New Plastic Insulator

➤ A NEW high-temperature, transparent plastic, that can be tempered somewhat as metals are hardened, is now in limited commercial production.

Made up of fluorine and chlorine to the extent of four-fifths of its weight, it is related to the new family of organic compounds, the fluorocarbons, which reached practical development during the war. Chemically it is trifluorochloroethylene.

Produced by M. W. Kellogg Co., of Jersey City, N. J., it came out of the laboratory of Dr. W. T. Miller of Cornell University.

Extremely resistant to chemical action, even to concentrated sulfuric, hydrofluoric and hydrochloric acids, it is nevertheless easily worked into shape. Although strong and hard, it is not brittle. Although suited to use at as high as 390 degrees Fahrenheit, it is also very satisfactory at very low temperatures, even at the cold of liquid nitrogen, 320 degrees Fahrenheit below zero. It is a good insulator for electricity and heat, and water rolls off it like the proverbial duck's back.

Because it withstands weather so well, it is likely to be used in instruments, airplane and ship parts, railroad signals and electrical insulation that get hard outdoors usage. It can substitute for glass in laboratories and chemical plants and handle corrosive gases and liquids.

It will be used at low temperatures and for electrical insulation in corrosive or humid conditions. Because it is not wetted by water or humid atmosphere, one use will be to avoid electrical short circuits due to water film condensation.

Because the new plastic, called commercially Kel-F, can be treated or tempered very much as though it were steel, it can be tailored or processed for use at a predetermined temperature.

Comparing the trifluorochloroethylene chemical structure of the new plastic with its fluorocarbon cousins, some of the fluorine is replaced by chlorine. Fluorocarbons are similar to familiar hydrocarbons of petroleum, but all of their hydrogen is replaced by fluorine, making fluorocarbons more inert.

Science News Letter, December 11, 1948

MEDICINE

Stomach Cancer Detection

➤ HOPE of saving the estimated 40,000 fatal stomach cancer victims in the United States each year by mass X-ray surveys was knocked down with the words "impractical" and "impossible" in a report by two Mayo Clinic radiologists to the AMERICAN JOURNAL OF ROENTGENOLOGY AND RADIUM THERAPY (Nov.).

The radiologists making the gloomy report are Drs. B. R. Kirklin and John R. Hodgson. They stated:

"It would take 1,917.6 roentgenologists examining a stomach every two minutes for eight hours steadily every day of the year, including Sundays and holidays, year after year continuously, to make a satisfactory survey of this group of people (all those over 40 years old) every three months."

All persons over 40 years would have to be examined, they explained, because they estimate that 95% of all the stomach

cancers occur in persons in that above-40 age group. This group makes up about 30% of our population.

The survey must be made on each person in the group every three months, they stated, because stomach cancer can develop within that time. If done less often, the purpose for which the examinations are made, detection of the cancer in time to save the patient, will be defeated, they stated.

"We believe that one of the most important parts of the campaign against cancer is the continued education of the public to an awareness of cancer," they stated. "We believe that this should be augmented and that this alone will bring many patients to the physician in time. In any event the public must be educated before any attempt to survey is tried. They should especially know why they have to be examined every three months."

Science News Letter, December 11, 1948

MEDICINE

Ringworm Rated Most Common Skin Disease

➤ RINGWORM, the fungus infection of the scalp and body, is probably the commonest skin disease today, Dr. Everett C. Fox of Dallas reported to the American Medical Association meeting in St. Louis.

He based his report on records of more than a million cases.

Eczema and acne also rate high on his list of the 10 most frequent skin diseases. The other seven on the itchy list are:

1. seborrhea, a scaly skin disease caused by excessive discharge from certain skin glands;
2. contact dermatitis, caused by irritation of the skin from various chemicals or animal or plant life;
3. impetigo, the superficial infection caused by streptococcus or staphylococcus germs;
4. scabies, commonly known as the itch;
5. nettle rash, or hives;
6. psoriasis, a chronic inflammatory skin disease characterized by patches covered with white scales;
7. pityriasis rosea, an inflammatory disease marked by reddish spots and ring-shaped patches upon the body.

Science News Letter, December 11, 1948

ZOOLOGY

Beaching of Pilot Whales Still a Zoological Riddle

➤ ZOOLOGISTS have never been able to find the reason for the suicidal "follow-the-leader" tactics of the pilot whale or blackfish, which caused a school of 44 of them to beach themselves near St. Augustine, Fla. This peculiar behavior is shared by a related species, the false killer whale, stated Dr. Remington Kellogg of the U. S. National Museum.

There used to be a small rendering plant on Nantucket, to salvage the carcasses of pilot-whale schools coming ashore on the North Atlantic coast. Its owner, Howard Wardell, would send a fleet of trucks to pick up the luckless little whales. This plant has now closed down, due to scarcity of raw material.

Scottish fishermen on the Orkney islands, and Danes on the Faroes, still take advantage of these chance harvests, and even help to drive the animals ashore by pounding on cans and tubs held in the water.

Beached whales do not die as fish die. They are air-breathing mammals, depending on lungs, not gills. However, when their bulky bodies are not buoyed up in the water, their own weight crushes them down, making them unable to breathe. So they die of suffocation, as a man might if he lay on the ground with a heavy weight on his chest.

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The first American automobile powered with gasoline was the Duryea car built in Springfield, Mass., in 1893.

METEOROLOGY

Rain-Making Ineffective

Extensive nine-month program of tests revealed that dry-ice seeding will not produce enough precipitation to be economically significant.

➤ NO ONE yet has done anything about the weather. Newest scientific support for this comes in the report of scientists who conducted an extensive nine-month program of tests to find out if the highly publicized dry-ice seeding could be used to make clouds rain or snow. Scientists of the U. S. Weather Bureau have concluded that this system will not produce enough precipitation to be useful.

To give the plan a thorough test, the Weather Bureau and the U. S. Air Force set up a 160-square-mile testing ground near the Clinton County Air Force Base, Wilmington, Ohio. Five Air Force planes, 55 ground weather stations and extensive radar equipment were used in the cloud-seeding operations in Ohio.

After nearly nine months of experiments, the Weather Bureau scientists concluded:

1. Not enough precipitation is produced to be economically significant.
2. Very little rain was produced unless there was natural rain within 30 miles.
3. No rain was produced except when there was natural rain falling within 40 to 60 miles.

Heading the scientific phases of the Cloud Physics Project was Dr. Ross Gunn of the physical research division of the Weather Bureau. The partial scientific report of the project was prepared by Dr. Gunn, Richard D. Coons and Earl L. Jones. Air Force operations were conducted by the All-Weather Flying Division, with Capt. Homer C. Boles in charge.

Not only did the experiments fail to produce significant amounts of rain, but the experiments showed that the seeded portions of billowy cumulus clouds might be dissipated by the seeding. This was observed in 10 of the 79 tests conducted.

Radar equipment aided in control of aircraft movements and in determining in what area rain actually fell and whether the rain was natural or induced by the seedings.

In addition to the best known dry ice method, water and chemical agents such as lead oxide and silver iodide were used.

Two series of experiments were made. In the first, winter layer clouds were seeded between Jan. 9 and May 1. A total of 38 operations failed to produce any precipitation unless rain was falling within 30 miles.

A series of 79 full-scale tests on cumulus clouds, conducted between March 18 and Sept. 8, produced rain in 18 clouds. But only five of the clouds produced rain when there was no natural rain within 30 miles.

In all of these five cases, natural rain was present within 40 to 60 miles.

The total of 117 experiments indicated that appreciable amounts of snow or rain are produced only when large masses of moist air are brought into an area by systems of winds that somehow produced large-scale cooling. This is the way natural precipitation is produced. Cloud seeding techniques, the study indicates, will provide no useful short cuts for relieving droughts, fighting forest fires or any of the other proposals suggested in the past two years.

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ENGINEERING

Tiny Cracks Grow to Large Splits When Metals Break

➤ WHEN METALS break, the fractures begin with extremely small cracks, investigations by General Electric scientists show. The break does not occur instantaneously

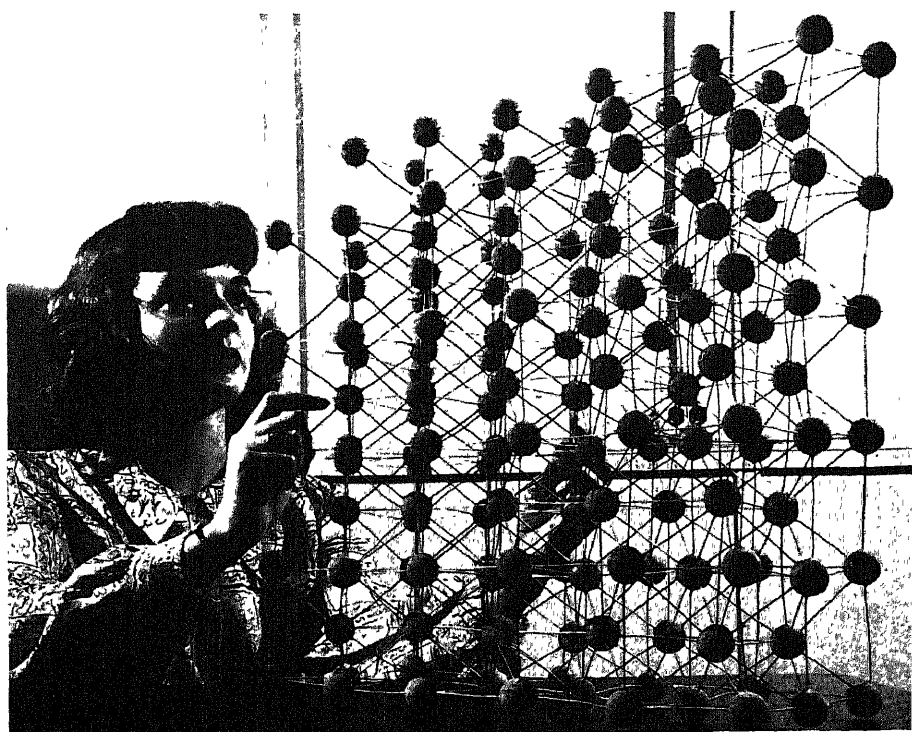
throughout the sample, as usually assumed. The tiny cracks are the nuclei which grow into a large split when enough tension is applied.

Bubbles that break a column of water have much in common with the tiny cracks in metal. Therefore, the metal studies began with research into how a column of a fluid breaks. The giant redwoods of California give a good example of how much tension a fluid can stand without breaking, the GE scientists said.

The larger redwoods pull columns of water in their trunks as high as 300 feet above the ground, under a tension of about 130 pounds per square inch. Water under such low pressure would be expected to boil. If this were to occur in a tree, the column of sap would be broken, and the tree would die. The redwoods survive because there are no nuclei of the critical size for the 130-pound tension exerted on the sap. Before the boiling process in fluids or the breaking process in metals can take place, there must be nuclei, the scientists stated.

The smaller the nucleus in a fluid column or in a metal, the bigger the force needed to expand it into a break. For every tension there is a critical bubble or crack size. If, when a certain tension is applied, there are nuclei of the critical size or larger, they will grow rapidly, causing the sample to break.

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MODEL IRON CRYSTAL—It is along the boundaries of such grains as shown in the model that tiny nuclei cracking spaces occur.

PHYSICS

Photograph Birth of Meson 13 Miles Above Earth

➤ **CAPTURING** at 13 miles above the earth's surface a picture of a powerful cosmic ray particle giving birth to a meson, fundamental bit of matter still largely unexplored, is hailed as an aid to finding new kinds of atomic energy.

Dr. Marcel Schein and J. J. Lord of the University of Chicago's Institute of Nuclear Physics reported their unique balloon flight photograph to the American Physical Society.

The particle from outer space rushed along with an energy of 20,000,000,000 electron volts and the production of the meson hardly affected the plunge earthward. There was no explosion when the meson was let loose, although usually there is normally star-shaped evidence of a great smash-up when a meson is detected in cosmic rays.

No man-made atom smasher is in the billion electron volt range yet, although two machines with ranges of from three to seven billion electron volts have been financed for completion in three to five years and artificial mesons have been made in the 400,000,000 electron volt cyclotron at Berkeley, Calif.

New hints of atomic energy may come from cosmic ray studies with photographic plates sent aloft in free-flying balloons to heights where the rays are powerful. The studies with nature's own atom smashers may point the way to some new atomic reactions that will release energy.

New transformations of fundamental particles that would yield potent projectiles are quite possible, as Dr. Cecil B. Ellis of the Office of Naval Research told the physicists, discussing new sources of atomic power.

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MEDICINE

Fall Over Tricycle May "Crack" Child's Kidney

➤ **MANY** a small child has had a "cracked kidney" from a fall over the handle bars of a tricycle or from a kick in the course of his play with other youngsters, Dr. Cyrus E. Burford of St. Louis warned at the meeting of the American Medical Association in this city.

The child may not complain much at the time but later will need an operation to save his life.

Children and athletes, he said, are vulnerable to serious kidney disease.

"Boxers and wrestlers receiving kidney punches bleed from bruised kidneys, and many develop kidney stones eventually," he said.

"Streptococcus throat infections in children not infrequently cause kidney disease,

many cases of which may be cured if recognized, managed, and treated by a physician."

Blood in the urine may be the only early symptom of cancer or kidney stones, Dr. Burford emphasized.

"Of importance is the seeming increase of tumors of the kidney and bladder first indicated by the appearance of blood in the urine. These are usually painless, and failure to diagnose the condition in the early stages denies the patient his chance for a cure," he said.

"Perhaps our greatest concern should be with young children who do not describe particular symptoms but whose urine may lead us to a diagnosis of Wilms' tumor of the kidney, one of the most malignant and rapidly growing tumors known, occurring almost exclusively in children under 11 years of age and which may be cured by surgery if discovered early.

"Silent stones in the urinary tract may cause blood in the urine as their only symptom until the kidney is damaged beyond recovery.

"Blood in the urine should always be given careful consideration, and if not readily explained deserves a complete urological examination to determine the source and cause."

Science News Letter, December 11, 1948

AERONAUTICS

Pilotless Planes Make Record Controlled Flights

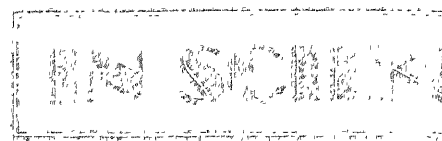
➤ **THE LONGEST** controlled flights ever made with pilotless aircraft powered with ram-jet engines were revealed by the U. S. Navy at its Air Missile Testing Center, Point Mugu, Calif. Several flights under radio control of more than 10 minutes were made.

The plane used was the Gorgon IV, officially the PTV-N-2, a high-winged monoplane 22 feet long, 10-foot wingspan, and almost no tail. It was purposely designed under Navy direction to operate at subsonic velocities. It was built by the Glenn L. Martin Company of Baltimore and powered by a ram-jet made by Marquardt Aircraft of Venice, Calif.

The ram-jet on this plane, seven feet long and 20 inches in diameter, is suspended below the fuselage well toward the rear. Because the ram-jet engine can not operate until it has sufficient speed to scoop up enough air for the combustion of its fuel, the plane in the tests was taken aloft by a U. S. Air Force Black Widow fighter from which it was released to obtain speed by gliding.

In flight, the plane was tracked by ground-based radar and maneuvered by ground-based radio control. It was completely instrumented to telemeter to a ground receiving station such data as speed, altitude, brake drag, controllability and engine operation.

Science News Letter, December 11, 1948



ENGINEERING

Warmer Color Is Added to Mercury Vapor Lighting

➤ **HEALTHY MEN** working under mercury vapor lights need no longer look pale and sickly, and women's lips may appear their natural or applied color. A fluorescent material, developed by a Westinghouse scientist, makes the light from the mercury vapor tube eight times richer in red than from the tubes of clear glass, and people under it look natural.

The material is a high-temperature phosphor, which is used to powder the inner glass wall of a mercury vapor lamp. This fluorescent coating transforms the invisible ultraviolet rays into pure red light which, added to the bluish-white light from the mercury vapor, gives illumination under which persons and objects appear more nearly in their true colors.

The discovery of the phosphor which transforms the invisible radiation into visible red light and at the same time withstands the high heat within the tube, was made by Luke Thorington of the Westinghouse lamp division staff. This temperature is in the neighborhood of 750 degrees Fahrenheit. The phosphor absorbs some of the light normally given off from the mercury vapor but the invisible ultraviolet converted into visible radiation more than offsets the loss.

When the first mercury vapor lamps were introduced in 1901, they produced a cold blue light which blackened red lips and distorted color values generally. Later they were improved by boosting the pressure of the mercury arc inside the tube. Still later, cadmium and zinc were added to the lamp itself. These devices cut overall lighting efficiencies. The new phosphor does not.

Science News Letter, December 11, 1948

PUBLIC HEALTH

Plastic Spoons Help Army Fight Disease

➤ **PLASTIC SPOONS** are the Army's newest weapon against disease.

A new C ration (Ration, individual, Combat, C-4), announced by the Department of the Army will have plastic spoons. The spoons are sterilized, sealed in cellophane wrappers and are to be thrown away after one meal. This is designed to combat dysentery, which sometimes has resulted from the use of utensils by troops with no facilities for cleaning them.

Science News Letter, December 11, 1948

MEDICINE

Streptomycin Mold Yields Vitamin B₁₂ Group Finds

➤ ONE of the newest vitamins, B₁₂, for pernicious anemia, can be obtained from the same species of mold that produces another important modern remedy, streptomycin, a five-man research team at Merck and Co., Rahway, N. J., have discovered.

The five are Edward L. Rickes, Frank R. Koniuszy, Norman G. Brink, Thomas R. Wood and Karl Folkers who last April first reported isolation of this vitamin from liver. They report their latest discovery in the journal, *SCIENCE* (Dec. 3).

The red crystals they have now obtained by fermentation from the mold, *Streptomyces griseus*, have the same beneficial effect in pernicious anemia as the vitamin B₁₂ from liver, Dr. Randolph West of Columbia University's department of medicine found.

The discovery is "an important stride forward from having to work up huge quantities of liver" to obtain the vitamin, George W. Merck, president of Merck and Co., pointed out. He hopes that the new vitamin can be made commercially available soon, although the extensive work now under way has not yet reached the stage, he said, where promises on commercial availability can yet be made.

Science News Letter, December 11, 1948

ENGINEERING

Reflective Radiant System Will Feature New Home

➤ REFLECTIVE radiant conditioning, not the relatively new radiant heating system, will be employed to keep a house to be constructed in Cincinnati comfortable in summer and winter, the University of Cincinnati revealed.

The house when completed will contain none of the conventional furnaces, air-conditioning units and insulation. Walls and ceiling surfaces are to be of embossed aluminum foil, one of the best heat-ray reflectors known. In place of heating plant there will be a few electrical resistance coils in each room for generating heat rays.

Cooling coils, resistance wires for heat, and fluorescent color lighting will all be placed in a cove near the ceiling, giving heat and light and removing radiant heat in hot weather only by indirection. The scheme, according to the university, is to heat and cool through radiant channels almost exclusively, with little or no concern for air temperatures or humidity.

This system for maintaining year-round indoor comfort is credited to Dr. Clarence A. Mills, of the university's medical college. He proved it to be workable 10 years ago under laboratory conditions. Now it is to be tested in an actual house, and the house is to be the residence of the physician.

In his laboratory work, Dr. Mills demonstrated that complete human comfort can be achieved by controlling heat loss from the skin through radiant channels alone. Thus an individual, he states, can be made equally comfortable at 100 degrees Fahrenheit or at zero by proper attention to the net rate of heat loss from the body.

"Let him lose heat freely by radiation from his body to a cold object, such as a wall surface, and he can disregard the hot air next to his skin," Dr. Mills declared. "Under such conditions his skin becomes distinctly cooler than the air next to it."

"And in colder air he is comfortable if his skin is kept warm by adequate rays from a radiant object, again such as a wall surface. Under this radiant system, wall and ceiling surfaces act as passive reflectors of heat rays, while their actual temperatures remain the same as those of the air mass next to them. Thus there is no longer any concern over heat flow through walls or ceiling and no further need for insulation."

Science News Letter, December 11, 1948

GENERAL SCIENCE

World Campaign for Literacy Expected

➤ A WORLD CAMPAIGN to be sure that everybody can read and write is likely now that Mexico's great teacher of literacy heads the United Nations Educational, Scientific and Cultural Organization.

Jaime Torres Bodet, who has just resigned as minister of foreign affairs of Mexico, recalls the successful "alphabetismo" program which he conducted in Mexico while he was minister of education. More than one million Mexicans learned to read and write as a result of this campaign for which only two million pesos (or about \$400,000) was spent. This was a cost of only about 30 cents per person.

Key method in the Mexican fight against illiteracy was a good neighbor process of having each literate person teach someone who had not had educational advantages. Thus, the lady of the house might be school marm to her cook and the head of a business concern might be the professor of reading and writing of a laborer in his employ.

Sr. Torres Bodet expressed the hope that UNESCO could be operated within the budget set up for it and that the many countries contributing to UNESCO will feel that they get a full measure of return for their financial and cultural support.

Science News Letter, December 11, 1948

PHYSICS

New Kind of Oxygen Has Been Created

➤ A NEW KIND of oxygen has been manufactured and discovered.

A Princeton University team of scientists, Drs. R. Sherr, H. R. Muether and M. G. White, reported to the American Physical Society meeting in Chicago that by flinging the hearts of hydrogen atoms into nitrogen compounds it is possible to create a very short-lived variety of oxygen.

This is the sixth isotope of oxygen to be known. It is oxygen 14, which makes it just the same atomic weight as the commonest sort of nitrogen. Both positrons (positive electrons) and gamma radiation are involved in the decay of the new kind of oxygen, which exists only about 76 seconds before it turns into an excited sort of nitrogen.

The other sorts of oxygen weigh 15, 16, 17, 18, and 19 times that of hydrogen, lightest of the elements, and oxygen 16 is the commonest sort in the air we breathe. Nitrogen 14 is also in the air.

Science News Letter, December 11, 1948

ENGINEERING

Ice in Continuous Column Extruded by New Ice-Maker

➤ HARD white ice in a continuous column comes out of a new ice-making machine described in New York to the American Society of Mechanical Engineers by Prof. John R. Watt of the University of Texas. The machine utilizes no brine, ice cans or labor.

Mr. Watt, who developed the process, explained that in his scheme a method of freezing the water from the inside outward is followed. In conventional ice-making the outside is frozen first. In his method, after the center core is formed successive layers are added around it to bring the whole to a proper size. It is like the growth of a snowball rolling down hill, he said.

Basically, the machine developed by Mr. Watts in his preliminary work was composed of a tank of water in which a doubled-wall tapered freezing cylinder was mounted big end up. A perforated ram at the bottom worked up and down in the lower end of the cylinder.

With the ram in low position and the machine filled with water, an ice core was frozen low down in the tapered chamber. When this was solid the ram lifted it about an eighth of an inch where a thin layer of water surrounded it. When this water was frozen, the ram and new core below raised it higher. With the process continued, the result is a column of ice built up of successive layers, visible to the eye but permanently bonded together.

Science News Letter, December 11, 1948

AERONAUTICS

Speedier Planes Foreseen

Jets and rockets have revolutionized flying since the Wright brothers' first hop 45 years ago. More speed and greater safety are forecast for the future.

By A. C. MONAHAN

➤ PARIS in an hour? Week-end trips to the moon? Routine travel faster than sound? Anywhere on the earth just across the airstrip?

Now aviation is two-score and five years old. Now the Wright brother's biplane, famous for its world's first 852-foot hop at Kitty Hawk, N. C., on Dec. 17, 1903, is back home in the Smithsonian Institution as one of the great national relics. Now jets and rockets streak the air with supersonic speed. Giant 100-passenger transports cruise above oceans and continents.

What's ahead? What will the intensive research of a hundred laboratories hatch for the air future? Here's what the experts dare to expect.

Planes of tomorrow may bear little resemblance to those of today. New power plants, new sleek design lines to meet the requirements of supersonic speed, and new air knowledge, may make them obsolete long before the end of the second 45-year period. What future airplanes will look like is only a matter of speculation.

Designed for Speed

Future planes designed for fast speed will perhaps be long and narrow, with lance-like noses to penetrate the air and bodies tapering to the rear, and with short but broad square-tipped wings whose forward edges will be sharp like knife blades. But, on the other hand, they may follow the design of the flying wing, a type of ship in which the entire surface contributes to lift, and drag is at a minimum.

What 1993 air travel will be is only a guess, but what the next few years will bring is more certain. Bigger planes may be built, but that is not particularly important. Economics, not mechanics, will probably be the determining factor. Greater speed seems to be a popular demand. Faster planes of the present types are certain as jet-propulsion replaces the conventional whirling blade propellers driven by ordinary engines.

In the relatively near future, transcontinental and transoceanic scheduled transports may have speeds approaching that of sound, approximately 760 miles at sea level. Improved jet engines will be responsible. It must be remembered that jet-propulsion is still in its infancy. It is only six years since the first American-built jet plane made a successful flight.

England had beaten us by over a year in this development, Germany perhaps even more. The engine in America's first jet plane was the British-developed type. Now America has several advanced jet engines of its own, and new types in the making.

Rocket ships have been proclaimed in popular literature as a possible conqueror of interplanetary space. Rockets are already playing an important part in aviation, but too much must not be expected of them in ordinary transportation. The duration of rocket-powered flight will always be short if the vehicle is subject to return to the earth through its gravitational influence, an aviation expert recently stated. This is due to the weight of the oxygen that must be carried in addition to the weight of the fuel.

The range of rocket-powered flight, he added, is theoretically very great in certain types. After leaving the earth's heavy blanket of atmosphere, the velocity of the rocket may be stepped to over ten times the values practicable in the lower atmosphere.

Present uses of rockets in aviation are principally as take-off assists to help get heavily loaded planes into the air, and as

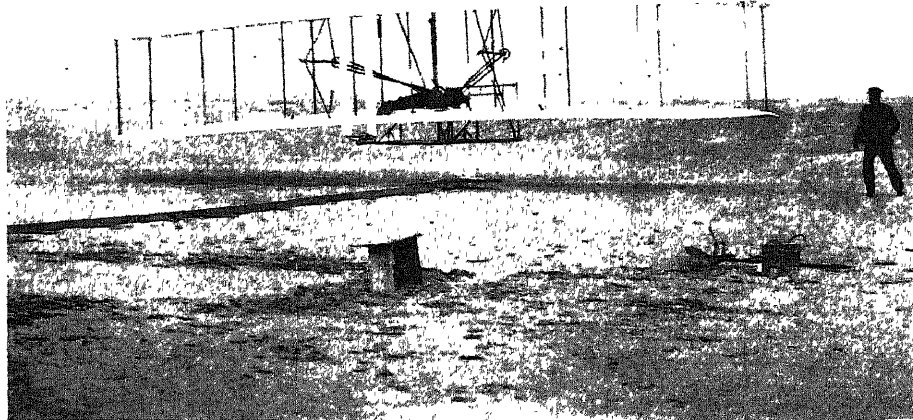
supplementary power to give spurts to planes in the air in emergencies such as might be encountered by a fighter in combat. Some day, they may be applied to craft designed to travel at very high altitudes to take them swiftly along the part of the course too high for other engines to operate.

Rocket engines are the only types now known which can be used where there is too little air to provide oxygen for combustion, a requirement in all other present engines. Rockets carry their own oxygen, usually in an oxygen-yielding chemical mixed in the fuel. Liquid oxygen is also used, particularly with liquid fuels.

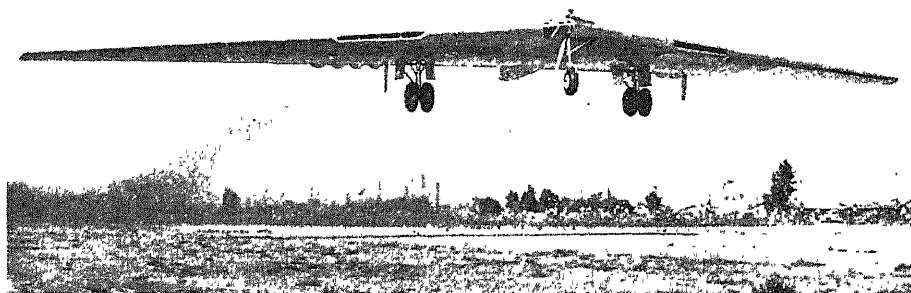
Atom-Powered Planes

Atomic power is a possibility for airplane propulsion in the future. Some engineers seem to think that it would be a comparatively simple matter to utilize the heat generated by the fission of atoms in the combustion chamber of a gas turbine. First, however, man will have to learn how to apply atomic energy to stationary equipment, and how to take care of the radio-activity and poisonous byproducts that are developed.

The ram-jet engine is also for auxiliary power, or for total power after a plane has reached a high speed. It can not be used as a take-off assist because it operates only after it has acquired sufficient speed



AVIATION'S HUMBLE ORIGIN—This is the original Wright plane which is famous for its world's first 852-foot hop at Kitty Hawk, N. C.



45 YEARS OF PROGRESS—This U. S. Air Force Northrop Flying Wing eight-engined, jet propelled bomber is one of the achievements of modern technology.

to be able to scoop up enough air for combustion. It is useless above the atmosphere because it depends upon air for its oxygen. But where it can be used, it is one of the most efficient power plants yet developed.

Ram-jet engines are of very simple construction. They are metal tubes open at both ends which scoop up sufficient air at speeds of some 300 miles per hour to unite with fuel in a combustion chamber. The gases of combustion are discharged at high pressure to the rear to cause propulsion. Its outstanding features are its high power per unit frontal area, and per unit weight, its high specific impulse as compared to rockets, and its mechanical simplicity.

Pilotless airplanes, controlled by radio, have already successfully flown many thousands of miles in company with control planes, separated by miles, from which the controls were handled. They take off and land under remote control. It will be remembered that pilotless planes, carrying photographic equipment, flew through the

air over the atomic bomb tests at Bikini. Their mothership flew safely to one side of the explosion area. Guided missiles, widely mentioned, are controlled in about the same way, using usually ground-based radio-radar stations.

Pilotless planes are not likely to be used in the near future to carry civilian passengers. They might some day be used for mail and express. A plane equipped with jet engines for take-off and landing, with rocket or ram-jet power in flight, might cross the Atlantic in a few hours. Control stations would be located on land or on anchored vessels or floating rafts between Newfoundland and Ireland.

Speed with Safety

Supersonic speeds without safety would have little value in commercial air transportation. But static-free very high frequency radio communication between aircraft and ground stations is already in use and vastly improved equipment is promised. Radio ranges, whose beams pilots follow, are also using very high frequency waves. They are an important safety factor, enabling a pilot to fly even under bad weather conditions.

Important also are the improved instrument landing equipments which enable a pilot to bring his ship safely to the airfield even when the runway can not be seen until down to within a hundred feet of it. Radar, radio, and approach and runway lights which can be seen a thousand feet through dense fog, all play important parts. The ground-controlled approach system, developed during the war to bring military craft safely in by means of radar and radio, has assisted many thousands of planes to runways. It is but about five

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years old. Already greatly improved, it is a system from which much may be expected in the future.

Within the next decade or so, greatly increased speeds in civilian transportation by air may be expected. Turbo-jet, ram-jet and rocket engines will be responsible. The so-called unbreakable sonic barrier, related to the elasticity of air which limits

the speed of sound, has already been broken. New designs to permit fast traveling and to withstand the air shock waves encountered may alter the general appearances of supersonic planes. And along with these developments the "everyman's" helicopter may be simplified and become a familiar sight in millions of backyards.

Science News Letter, December 11, 1948

or direct to Science Clubs of America, 1719 N St., N. W., Washington 6, D. C.

Science News Letter, December 11, 1948

GENERAL SCIENCE

Young Scientists Compete

Eighth Annual Science Talent Search is under way this month with 16,000 boys and girls competing for the \$11,000 in Westinghouse Science Scholarships.

➤ TEEN-AGE scientists all over the United States are sitting down for some pre-Christmas writing.

Their three-hour composition will be no letter to Santa Claus but it will bring 40 of them the best Christmas present they ever had—an invitation to the five-day Science Talent Institute in Washington and a chance to win a Westinghouse Science Scholarship.

Some 16,000 boys and girls began to take, on Dec. 1, a three-hour science aptitude examination in their own public, private and parochial schools as the first step in the competition for the \$11,000 in Westinghouse Science Scholarships offered in the Eighth Annual Science Talent Search, conducted by Science Clubs of America,

administered by Science Service.

The high school seniors, all of whom aspire to careers in science, will also submit scholastic and other recommendations and a 1,000-word essay on the subject, "My Scientific Project" before the competition closes at midnight, Dec. 27.

Judges to Name 40 Winners

The science aptitude examination, designed each year by Drs. Harold A. Edgerton and Stuart H. Britt, New York psychologists, is planned to reveal ability to think and reason rather than to measure acquired knowledge of science.

Only 40 boys and girls will be invited to the Eighth Annual Science Talent Institute March 3 through 7, 1949. For five days they will learn about new developments in science, listen to and talk with prominent scientists and be introduced to possibilities for their future in scientific research.

During their five-day all-expense stay in Washington one of the young scientists will receive the \$2,800 Westinghouse Grand Science Scholarship. Runners-up will receive scholarships ranging from \$100 to \$2,000. The \$11,000 in scholarships will be awarded at the discretion of the judges: Drs. Edgerton and Britt; Dr. Harlow Shapley, director, Harvard College Observatory; and Dr. Rex E. Buxton, Washington psychiatrist.

Honorable Mention For 260

The judges will name 260 other entrants in the Science Talent Search for Honorable Mention and Science Clubs of America will assist them as well as the 40 winners in getting scholarships at the colleges, universities and technical schools of their choice. Previous Honorable Mentions have received valuable scholarships and other financial assistance in this way to continue their education.

Entry materials and full details of the Eighth Annual Science Talent Search can be obtained by writing to Science Service

GENERAL SCIENCE

Adjustable Laboratory Featured in New Building

➤ LABORATORY SPACE tailored to fit the needs of individual experiments can be arranged in the \$8,000,000 first section of General Electric's new research laboratories near Schenectady, N. Y., which has just been dedicated.

Standardized steel partitions in the building can be set up or taken down in a few hours to create different room sizes. Pipes and conduits in the laboratory will supply the researchers with direct and alternating electrical current of various voltages, city water, distilled water, illuminating gas, oxygen, hydrogen, nitrogen, compressed air, vacuum and steam.

Science News Letter, December 11, 1948

CHEMISTRY

New Synthetic Detergents Have Advantages Over Soap

➤ ONE POUND of synthetic detergents is now sold for every five pounds of soap, and these newer cleansing agents boast several advantages, the American Oil Chemists' Society meeting was told in New York.

Foster Dee Snell of Foster Dee Snell, Inc., said that the synthetics usually work better in hard water than in soft. On the other hand, more than half of the soap used in your household probably goes to soften the water so that the rest of the soap can do its work. Development of synthetic detergents also may help the world food situation, he added. Soaps are made from fats and oils, while many of the detergents are made from petroleum.

Science News Letter, December 11, 1948

Hydrazine hydrate is an important ingredient in some rocket fuels.

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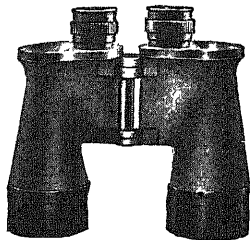


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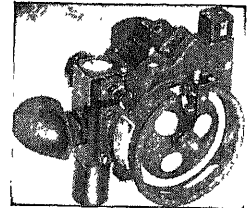
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Gathering into Barns

➤ AT HARVEST time, we are apt to become a bit satisfied with ourselves, regarding man as the only creature that looks toward the future and seeks security against its chances by laying in supplies. Yet a moment's looking about will dispel this mistaken pride, for the world is full of other beings that also gather into barns.

Rodents as a class offer numerous interesting examples of this hoarding habit. Squirrels lay up stores of nuts and grain, beavers stock their ponds with sticks bearing tasty bark, certain wild mice lay by quantities of seeds, and the pika or little chief hare of the Rocky Mountains cures hay and packs it away in his rock-crevice home.

Birds are not often thought of as hoarders; indeed, they are cited in the New Testament parable as among the creatures that take no thought for the morrow. Yet a few of them do store food. The habit of the shrike or butcher-bird, of hanging his victims on thorns or the prongs of barbed-wire fences, is not a torturer's trick, as has been widely believed, but only a bit of packing-plant technique. California woodpeckers wedge acorns into cracks, or into holes of their own drilling, and come back later to consume them.

Often this hoarding habit runs away with itself. The bird or beast goes on

storing and storing, in a veritable orgy of acquisitiveness, long after reasonable provision has been made for the future. Such creatures pass the thrift line and become mere capitalists, getting merely for the sake of getting, even losing track of all they have gathered.

An industrious California woodpecker, for example, will hammer away tens of thousands of acorns, and even stick smooth pebbles into his storage-crevices, and leave them there for years unused, while he just as assiduously stores the next season's crop.

Such excess of storing activity invites its own penalty. Bees are notorious for the way they will fill to overflowing whatever cavity they may chance to be inhabiting. Beekeepers know this, and pile super on super, letting them fill all the frames. Then they take away almost all the honey, leaving only enough to carry the bees through to the beginning of another season. And the poor, silly, exploited insects don't seem to have the least idea of what is happening to them.

Science News Letter, December 11, 1948

PHARMACOLOGY

Filling Prescriptions

➤ HOW TO assure the proper filling of 400,000 prescriptions each year is the main subject of a two-year pharmaceutical survey summarized by the American Council on Education.

"The American people need to realize that every time a prescription is taken to one of the 55,000 retail drug stores in this country not only health but oft-times life is at stake," said Dr. Edward C. Elliott, president emeritus of Purdue University, who directed the survey. (See SNL, Dec. 4, p. 367).

The survey concluded that there are approximately 96,000 pharmacists in the nation. War-time shortages are being caught up and if the present annual number of graduates totaling 4,300 is maintained there will be a surplus of trained pharmacists in 1950.

The drug store must continue to be a department store, selling banana splits, household supplies, candy, tobacco, cosmetics, etc., the survey admitted. Druggists must be successful businessmen as well as capable professionals.

The typical drug store, the survey implied, has become a community institution, social center and a source of advice dispensed along with medicine by the "Doc" behind the counter.

Recognizing the reasons why liquor is sold in some drug stores, the committee declared as a matter of common understanding that "such sale must be regarded as distinctly detrimental to the public profession of pharmacy."

Among the recommendations made by the survey report are:

Continue accrediting of colleges of pharmacy by the American Council on Pharmaceutical Education, and provide higher salaries and better qualifications for teaching staffs.

Select students for the pharmacy profession by testing before admission, together with explanations to high school students about pharmacy.

Make the present requirements for practical experience for licensure more practical or abolish them.

Take steps toward a six-year course that would lead to a Doctor of Pharmacy degree, supplementing the present four-year B.S. degree.

Study the prescriptions filled throughout the country to determine changes in practice by physicians and the effect of new drugs introduced.

Science News Letter, December 11, 1948

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ADVENTURES WITH ANIMALS AND PLANTS—Elsbeth Kroeber and Walter H. Wolff—*Heath*, 600 p., illus., \$3.20. A biology text for high schools made very attractive by generous illustration with photographs and drawings.

ANIMALS WITHOUT BACKBONES: An Introduction to the Invertebrates—Ralph Buchsbaum—*University of Chicago Press*, 371 p., illus., \$6.50. Any lover of nature or of photography will delight in this beautiful book with the story of invertebrates told in pictures and non-technical language. It also serves as college text and is a new printing of a book first published in 1938.

CAN FARMERS AFFORD TO LIVE BETTER?—Lowry Nelson—*National Planning Association*, 32 p., paper, 50 cents. An Agriculture Committee report.

THE CHEMICAL ARTS OF OLD CHINA—Li Ch'iao-p'ing—*Journal of Chemical Education*, 215 p., illus., \$5.00. A charmingly illustrated book on such things as the origin of gunpowder, and early experiments with gold, dyes, soybean products, lacquer and glue.

CLINICAL INVESTIGATION OF BENTONITE-PETROLATUM OINTMENTS AND OINTMENT BASES—Lester Hollander—*Mellon Institute*, 10 p., illus., paper, free upon request direct to publisher, University of Pittsburgh, Pittsburgh 13, Pa. Certain advantages were found for this new type of base, including its moisture absorbing qualities.

THE CONQUEST AND COLONIZATION OF YUCATAN, 1517-1550—Robert S. Chamberlain—*Carnegie Institution of Washington*, 365 p., illus., paper \$4.75, cloth \$5.50. A history of the Spanish conquest of a province which held not great riches but good agricultural and pastoral promise and the clash between the Montejos of Spain and the Mayas.

DEMANDS FOR LABOR: OPPORTUNITIES FOR RESEARCH—Dale Yoder—*Social Science Research Council*, 40 p., paper, 50 cents.

GROUND-WATER RESOURCES OF REPUBLIC COUNTY AND NORTHERN CLOUD COUNTY, KANSAS—V. C. Fishel, S. W. Lohman, and H. A. Stoltenberg—*University of Kansas*, 194 p., illus., paper, 25 cents. A study of one of the most important of natural resources.

JAMES WATT AND THE INDUSTRIAL REVOLUTION—H. W. Dickinson and H. P. Vowles—*The British Council (Longmans, Green)*, 57 p., illus., paper, 60 cents. An important chapter in the history of England and of the modern mechanical world.

MINERAL NUTRITION OF PLANTS AND ANIMALS—Frank A. Gilbert—*University of Oklahoma Press*, 131 p., illus., \$2.75. The need for such a review of important literature on mineral nutrition became apparent to the author during experiments at Battelle Memorial Institute.

PRINCIPLES OF RADAR—Denis Taylor and C. H. Westcott—*Cambridge (Macmillan)*, 141 p., illus., \$3.50. A concise book for engineers, physicists, mathematicians and advanced students of radio. Of British origin.

THE SCIENCE OF BIOLOGY TODAY—Trofim Lysenko—*International*, 62 p., \$1.25. The controversy in Soviet Russia over the theories of genetics as viewed by one of the leading figures opposing the chromosome theory.

VELOCITY-MODULATED THERMIONIC TUBES—A. H. W. Beck—*Cambridge (Macmillan)*, 180 p., \$3.75. Not a text but a technical work for radio engineers. Of British origin.

Science News Letter, December 11, 1948

RADIO

Sound Reproduction More Efficient with Ceramic

➤ A WAR-DEVELOPED substitute for mica in radio condensers, barium titanate ceramic, promises to give superior performance to specialized loudspeakers or submarine sound detection microphones. The barium titanate, when placed in a field of several thousand volts, acts as a "transducer" and converts sound pressure to electric signals or back again with high efficiency.

W. P. Mason of the Bell Telephone Laboratories, reporting in the *PHYSICAL REVIEW* (Nov. 1), finds that the electrical behavior of barium titanate when fused into a ceramic is very similar to the magnetic behavior of the magnetostrictive nickel alloys that were used successfully in underwater sound projectors during the war. The term "electrostrictive" has been applied to its behavior.

The superiority of the barium titanate ceramic transducer is due to its large mechanical motion from a small electrical signal. In this respect its performance is superior to nickel magnetostrictive materials and is even superior to the much-used rochelle salt crystals. The ceramic has the additional advantage of being affected very much less by temperature changes than rochelle salt, its nearest competitor.

The ceramic is being widely used in new radios and television sets in condensers to

replace mica and to give a hundred-fold increase in electric storage capacity.

Application of titanate ceramics to a phonograph pick-up and to a microphone was reported to the Acoustical Society of America meeting recently by H. W. Koren of the Sonotone Corp., Elmsford, N. Y. A metal strip with a thin plate of ceramic soldered to one end or with thin plates soldered to both sides was used with good results.

Science News Letter, December 11, 1948

AERONAUTICS

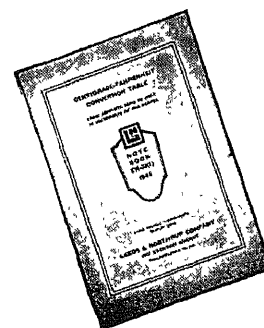
Airliner Can Be Dropped 10,000 Feet in a Minute

➤ A BIG multi-engine airliner can be made to drop 10,000 feet in a minute by reversing the thrust of the propellers in flight.

Curtiss-Wright Corporation officials who demonstrated the quick drop system listed three advantages:

1. Emergency landings can be made quickly from high altitudes.
2. Military planes can use the maneuver in combat.
3. Less time will be lost at low altitudes by planes which operate most efficiently at high altitudes.

Science News Letter, December 11, 1948



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⚙️ **GLASS LENS**, for use with ordinary household incandescent lamps, is quickly attached and held in position to direct the light where wanted by clips similar to familiar lampshade holders. It produces a bright area of considerable size approximately with twice the illumination obtained without it.

Science News Letter, December 11, 1948

⚙️ **WATER-INJECTOR**, to add moisture to gasoline entering automobile engines, utilizes the dual fuel principle employed on some airplanes. This easily installed unit is controlled through connection with the accelerator; as the gasoline feed is increased, the supply of water injected into the carburetor automatically increases.

Science News Letter, December 11, 1948

⚙️ **STALL-WARNING** device for airplanes utilizes a simple mechanical method of sounding a horn and turning on a light on the instrument board to let a pilot know his plane is approaching a stall. A stall is a condition encountered when a plane climbs too steeply and the air flowing over the wing fails to provide lift.

Science News Letter, December 11, 1948



⚙️ **TINY POWER UNIT** for toys, shown in the picture, is operated by two standard flashlight batteries which are inserted at will in the plastic base-box of the engine, and delivers power by moving belt

hooked over the hub cap of one of its flywheels.

Science News Letter, December 11, 1948

⚙️ **ANTENNA KITS**, for use with FM radio television receivers, contain a base mount to attach to the house and a number of attachment parts which can be selected to meet a particular situation. These new kits for installation men feature a degree of flexibility to meet all local television requirements.

Science News Letter, December 11, 1948

⚙️ **ROOFING PLANK**, molded from mineralized wood chips combined with portland cement, combines in a single unit roof-decking, insulation and sound absorption. It is resistant to fire, termites, fungi and moisture.

Science News Letter, December 11, 1948

⚙️ **FENDER TOOL**, to remove dents and creases in automobile fenders, is a nine-pound hand tool of horseshoe shape, with one arm extended inward to carry a revolving wheel and the other a lever and contact plate. Plate and wheel are screwed together to flatten the dent.

Science News Letter, December 11, 1948

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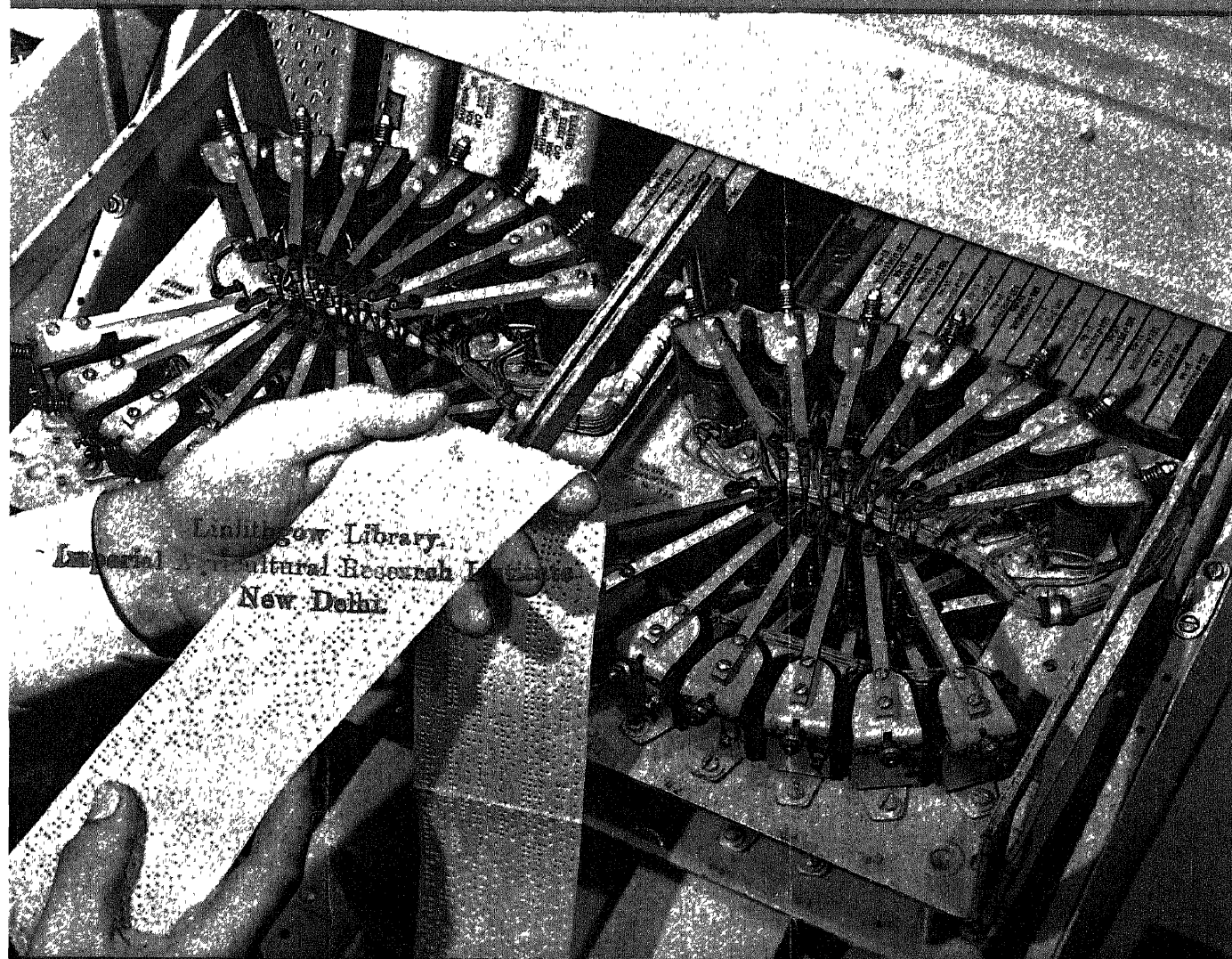
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SCIENCE NEWS LETTER

In This Issue—SCIENCE REVIEW OF THE YEAR

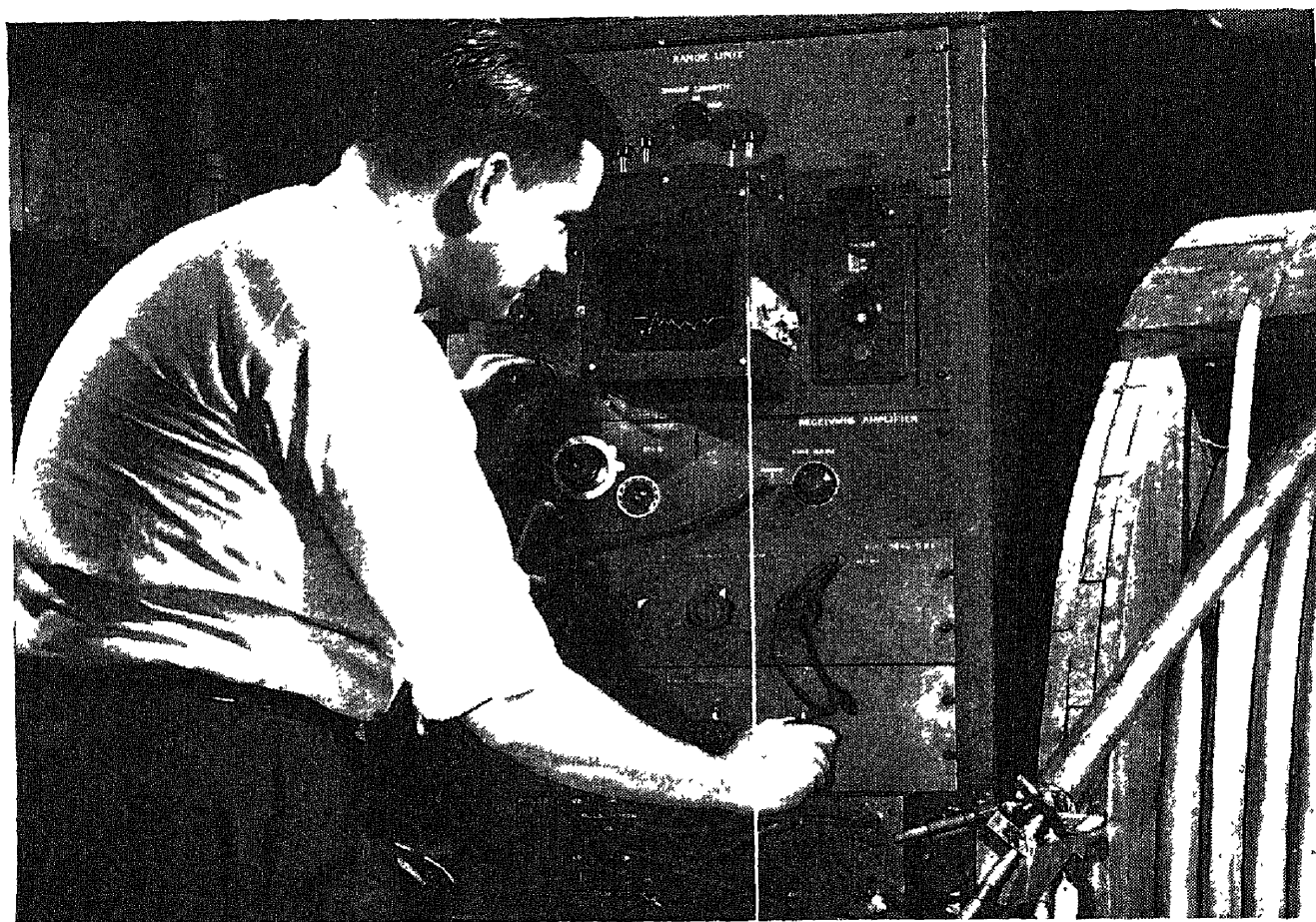
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Robot Phone Accountant

See Page 399

A SCIENCE SERVICE PUBLICATION



He asks an echo

Radar sends out pulses of electric waves which, reflected from a target, return to reveal the target's location.

Likewise, the apparatus pictured above sends electric waves over a coaxial telephone cable. Minute irregularities reflect the waves back to their origin; the echo makes a trace on an oscilloscope screen and so tells where to look for the trouble.

Telephone messages need smooth "highways" over which to travel across country: circuits able to transmit every talking frequency, without distortion.

Television needs even smoother highways and at many more frequencies. So Bell Laboratories devised this method of spot-testing the cable over the entire frequency band needed for telephone or television. It is so delicate that any possible interference with transmission is detected at once. Its use makes sure that every inch of highway is clear.

This is another important example of how Bell Telephone Laboratories constantly develop finer communications for the nation.



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AERONAUTICS

Air-Borne Engine Starter

Jet plane usability will be greatly increased with the high-speed air turbine starter which is attached to the engine. It is a push-button device.

➤ JET-ENGINE planes, and those equipped with turboprops as well, will have their use greatly increased with a new self-starter system revealed in Philadelphia by the U. S. Navy Bureau of Aeronautics. It is said to be the first successful air-borne self-starter developed for this purpose.

The new self-starting system, a unit installed in the plane, will allow jet and turboprop aircraft to use out-of-the-way bases which are not equipped with ground apparatus to start their engines. It eliminates the use of cumbersome storage batteries or other heavy auxiliary power units outside the plane.

The problem of starting a jet propulsion engine is one of the handicaps in the wider use of this type of propulsion in aircraft. It is radically different from the job of starting ordinary reciprocating aircraft engines in the amount of power required. Starters for reciprocating engines use from two to four horsepower. Starters for turbo-jet and turbo-propeller engines require from 10 to 250 horsepower. The new development will give the required power and still is light enough to be installed in a plane.

The new self-starter is a pneumatic starting system, perfected by AiResearch Manufacturing Company, Los Angeles, in connection with the Navy Bureau of Aeronautics. It includes a completely new light-weight auxiliary gas turbine engine and a highly efficient midget air turbine. The engine weighs only 88 pounds. The highly compressed air delivered by it operates the high-speed air turbine starter which is attached directly to the jet or turboprop engine.

The auxiliary gas turbine is started by a three-quarter horsepower electric motor which gets its power from a single storage battery. It is all a push-button device. When the pilot pushes a button, the electric motor starts. The rest is automatic.

The auxiliary engine which powers the starter is designed also for other uses after its number one job is completed. It can be used to pressurize the cabin, for air-conditioning, heating and de-icing, and to operate other power-consuming devices, such as the plane accessories.

The complete self-starting system weighs only 104 pounds. When used in planes with several engines, only one gas turbine is needed. The compressed air from it is carried by ducts to the various jet or turboprop engines.

Two versions of the diminutive multiple-use gas turbine have been developed by

AiResearch. Both represent a substantial decrease in weight and size over existing aircraft auxiliary power units. They may be adapted for ground sources of auxiliary power and industrial applications. High-precision turbine wheels spinning in excess of 40,000 revolutions per minute, together with combustion temperatures higher than 1,600 degrees Fahrenheit, make possible their exceptionally high ratio of power for weight and size.

Science News Letter, December 18, 1948

CHEMISTRY

Synthetic Alcohol Made From Gasoline and Gases

➤ THE FIRST commercial production of a synthetic alcohol has been achieved by Esso Standard Oil Co. at Baton Rouge, La., by a new process which provides a large low-cost source of raw material in plastics manufacturing.

The synthetic, iso-octyl alcohol, is used in the production of plasticizers, a basic

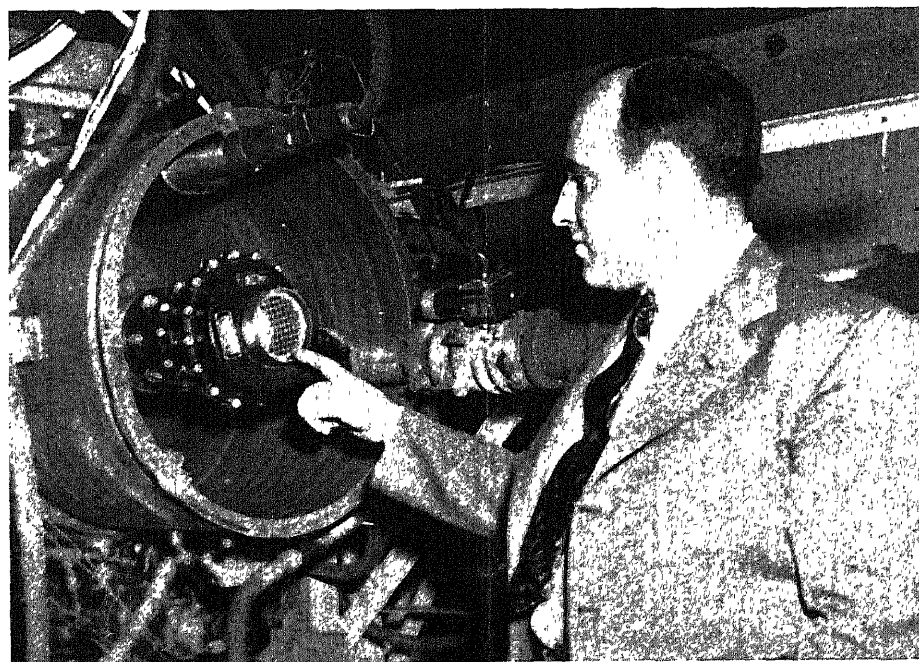
ingredient in compounding and forming plastics and in giving flexibility and suppleness to the finished products. Plasticizers are used in a wide variety of plastic products including fabrics for upholstery and curtains, phonograph records, food packaging, floor coverings, paints and varnishes, and in rubber compounding. Full-scale production by this method will help relieve current shortages in plasticizers.

The process involves the reaction of a selected gasoline fraction with hydrogen and carbon monoxide gases in the presence of a special catalyst at pressure up to 3,000 pounds per square inch. Crude alcohol is recovered from the high-pressure operation and purified to yield finished iso-octyl alcohol. The process is flexible and other alcohols and chemicals can be made from it.

This method is an adaptation of the Oxo process and culminates three years of extensive laboratory and pilot plant experimentation by Standard Oil Development Company, central research organization of Standard Oil Company (New Jersey) affiliates.

Iso octyl is principally an "intermediate" or raw material for other chemicals. It also has possibilities as a resin solvent and anti-foaming agent. Through other processes it can be converted to wetting agents or to metallic salts that make effective paint driers.

Science News Letter, December 18, 1948



SELF-STARTER FOR JETS—Jet and turboprop aircraft will be able to use out-of-the-way bases not equipped with ground apparatus to start their engines when this air-borne system goes into effect.

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MEDICINE

Drug Aid for Pneumonia

Aureomycin may succeed in checking virus pneumonia where the antibiotics and sulfa drugs have failed, it appears from preliminary trials.

➤ **CHEMICAL** conquest of virus pneumonia which has defied other remedies from sulfa drugs to penicillin and streptomycin, may come from one of the newest of mold-fungus class of drugs, aureomycin.

Success in treatment of 13 consecutive virus pneumonia patients with this golden yellow drug was reported by Drs. Emanuel B. Schoenbach and Morton S. Bryer of the Johns Hopkins School of Medicine at the meeting of the eastern section of the American Federation for Clinical Research in Philadelphia.

"The response to treatment was dramatic," the doctors stated.

The patients, ranging in age from 10 to 59 years, were all except one severely, though not gravely, ill. All were in the hospital. In nine, the temperature had been 104 degrees Fahrenheit or higher before the aureomycin treatment. Ten of the patients had gotten sulfadiazine or penicillin or both without any apparent improvement.

Back to Normal

Within 24 hours after aureomycin treatment was started, the temperature was back to normal in nine of the patients. In another three patients the temperature was down to normal within 24 to 48 hours. In one extremely ill patient, who had turned blue and had four lobes of his lungs involved, it took 72 hours for the temperature to go to normal, although the patient responded excellently to the treatment. The nine who lost their fever within the first 24 hours of treatment did not get the new drug until they had been sick from two to 21 days.

No sign of drug toxicity appeared in these patients nor in over 80 with other fevers who were treated with aureomycin.

The results with the virus pneumonia patients "would indicate," the doctors stated in the usual conservative scientific wording, "that this drug is an effective chemotherapeutic agent for primary atypical non-bacterial (viral) pneumonia."

Virus pneumonia, as it is commonly called, has been reported with increasing frequency during the past 15 years. The increase started just about the time the sulfa drugs appeared on the scene to cure the formerly much dreaded pneumococcal pneumonia.

Not Often Fatal

Though virus pneumonia is not often fatal, it may be quite disabling and persist for many weeks. It starts gradually with a non-productive cough, headache and sick feeling. Diagnosis is based on these symptoms and on X-ray evidence of lung consolidation, a low to normal white blood count, bacteriological and other blood tests that rule out other similar diseases and the fact that even massive doses of sulfadiazine and penicillin do not affect it.

Aureomycin was discovered by Dr. B. M. Duggar of the Lederle Laboratories division of the American Cyanamid Company. First announcements of its disease-curing ability were made at a New York Academy of Sciences conference last July (*See SNL*, July 31). It comes from a kind of fungus and is related to streptomycin.

Besides the virus pneumonia patients, the Johns Hopkins doctors report they have used it thus far in 13 cases of Rocky

Mountain spotted fever, five cases of undulant fever (all with positive blood cultures), one case of recrudescence epidemic typhus fever, several cases of hemolytic Staphylococcus aureus sepsis which the layman calls blood poisoning, two cases of peritonitis and two cases of purulent pneumococcal and streptococcal meningitis, "among many others." In all cases the drug has proved an effective remedy, bringing "prompt remission of the disease."

Science News Letter, December 18, 1948

Some of the *synthetic rubbers* used for insulating underground electric cable appear to be more resistant to destructive organisms in the soil than natural rubber.

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GENERAL SCIENCE

Science Review for 1948

Supersonic flights, penicillin pills for gonorrhea prevention, and man-made mesons are among the most important achievements of the year.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of SCIENCE NEWS LETTER for the current year. If you wish to refer to any particular report, you may find it readily through the index. (See SNL, June 26 and also the issue which will appear next week, Dec. 25).

By SCIENCE SERVICE STAFF

➤ TOP achievement for 1948 is man's physical conquest of his environment: Flight of piloted jet planes faster than the speed of sound.

Top medical achievement: Prevention of gonorrhea by swallowing a single penicillin pill a few hours after exposure.

Top atomic event: Artificial creation of the meson, fundamental particle, by intense cyclotron bombardment, which promises better understanding of the atomic nucleus or heart.

The future may tag the year 1948 with other advances, such as the first operation of the 200-inch telescope on Mt. Palomar.

Discovery of aureomycin, golden drug to combat some diseases due to rickettsia and viruses, ushers in conquest of more diseases. Another promising antibiotic is polymyxin, and there are new sulfa drugs.

Chemists rejoice over the synthetic production of glycerine from petroleum, a new acrylonitrile fiber rivaling nylon, and "cold rubber" synthetically made at near-freezing temperatures that is better than the natural material.

Atom smashing with atomic bullets of three to seven billion electron-volts—rivaling the immense punch of cosmic rays—will be possible in three to five years because the Atomic Energy Commission in 1948 authorized two giant particle accelerators, one at Berkeley, Calif., and the other at Brookhaven, N. Y.

There are hints of cancer conquests to come. A new high speed X-ray camera technique promises to discover earlier more cases of stomach cancer. And there is hope that cancer-blasting radioactivity can be worked into chemicals that will travel to particular parts of the body where cancer is found to exist.

The neutron (particle that triggers the atomic bomb) was used to probe the structure of crystalline matter, surpassing the results of similar electron and X-ray diffraction.

Man's fight on the insects was reinforced by methoxychlor, chemical that kills insects untouched by DDT yet is harmless to

people and animals. A mysterious X disease attacked American cattle.

AERONAUTICS

Piloted Plane Flew Faster Than Speed of Sound

Speed of sound was surpassed many times following report that an Air Force pilot had achieved sustained horizontal supersonic flight in a piloted plane.

New official world record of 670 98 miles per hour was set by an Air Force test flyer with a fully armed standard jet fighter, the North American F-86.

Jet engine for aircraft, capable of producing approximately 5,000 pounds thrust, was installed in the North American F-86A.

Giant bomber, the Air Force's B-36, completed a 6,000-mile test flight with a gross weight of 300,000 pounds, heaviest load ever carried by an airplane.

Super-supersonic wind tunnel for testing guided missiles and aircraft has a perfectly-controlled flexible throat that permits quick changes in the supersonic flow of air.

Two supersonic wind tunnels many times larger than any others in the world, were completed, with a third, largest of all, nearly completed at government aviation laboratories.

Experimental development was begun on the world's largest helicopter, to be equipped with a detachable, bus-sized capsule.

Construction was begun on the world's largest warship, a 65,000-ton aircraft carrier without the familiar "island" superstructure.

Interchangeable hulls, radically new development, on a light-weight Navy amphibian plane underwent extensive flight and landing operations to determine the best design.

Floating drydock 103 feet long and nearly 40 feet wide, designed to permit repair work on giant seaplanes without hoisting them aboard seaplane tenders, successfully passed tests.

Charts for use of pilots were issued showing the airspeed limits within which nine types of transport and cargo planes of various weights can be most safely operated in thunderstorms.

Slope-line system for approach-lighting to a runway was developed; it also provides a glide path.

Periscope for airliners combined in one delicate instrument the periscope and bubble sextant, enabling navigators to determine their positions by the stars without the customary viewing bubble projecting above the plane surface.

New nylon fabrics for parachutes, dubbed rip-stop material, added safety in jumping from planes by its strength and ability to stop tiny rips before they spread to make the parachute useless.

First self-contained, air-borne, self-starter

system for jet and turboprop aircraft was revealed.

Molybdenum nozzles on ram-jet engines were protected from gas temperatures ranging up to 3,000 degrees Fahrenheit by several ceramic coatings.

Refractory porcelain blades showed promise for use in high temperature turbo-jet engines.

All conditions of flight of which a plane is capable were reproduced by a huge electronic-mechanical device, complete with an accurately simulated flight deck, developed to aid pilot training.

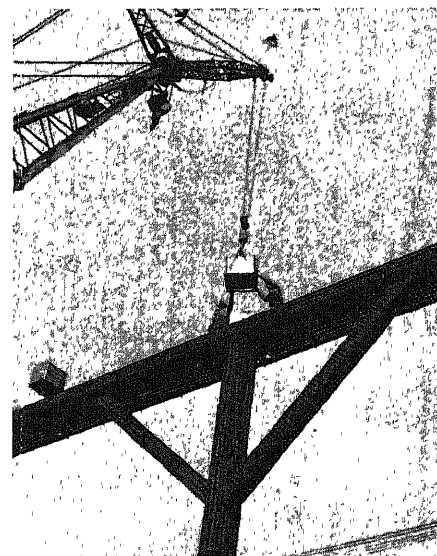
Radically new plane with channel wings replacing the customary straight wings underwent taxi tests.

Experimental wing for airplanes had a suction slot through which part of the boundary layer of air is drawn away.

Drag caused by ordinary projecting air-borne antenna for planes and rockets was eliminated by unique notch antenna that lies flat on the flying object's surface.

Tiny experimental wind tunnel with a test section only one inch square duplicated actual pressure conditions up to an altitude of over 45 miles.

Motors with their rotating part outside and stationary part inside were built for testing missiles in wind tunnels.



WORLD'S BRIGHTEST LIGHTS
—Pictured here is the 69-light system being installed at the Landing Aids Experiment Station, Arcata, Calif., for test by the Air Force. The krypton "flash" unit the workmen are handling can produce flashes of more than three billion candlepower—enough to penetrate 1,000 feet of fog. Lights like the one being installed here will help guide pilots flying the Berlin airlift.

"Sweat-cooling" system which operates in somewhat the same way as the body's perspiring was found to increase the efficiency of turbo-jet engines.

Clothing ventilated by piping air through tubing to all surfaces of the body kept pilots comfortable at temperatures ranging from 30 degrees below zero Fahrenheit to 180 degrees above.

Two-color viewing screens were developed for airport radar scanners.

Radio navigation system showed on a meter the exact position of a plane at any time and place during flight.

Military and civil aviation joined hands in a billion dollar 15-year program to make all-weather flying a reality in the United States.

Navy helicopter featured all-metal rotor blades; hollow steel blades were perfected for airplane propellers.

Auxiliary power system of compressed air was invented to set rotors of helicopters and autogiros spinning without excessive expenditure of fuel.

Blowing air over models of radiators cast in naphthalene and noting rate of evaporation at different points, proved a simple technique for testing radiator designs.

Ground-based device for measuring the velocity of high frequency sound waves accurately determined the speeds of fast-traveling airplanes.

Light thin paneling with remarkable nonconductivity of heat was made of two extremely thin sheets of carbon steel with cellulose acetate plastic between.

Ram-jet-like device called an afterburner, attached to the exhaust of a jet-engined airplane, was found to give special spurts when needed; combination piston-jet engine was developed which uses its exhaust gases for supplementary jet power.

Carburetor ice detector was developed to warn of dangerous ice in the engine fuel induction system.

First carrier-based jet fighter, Grumman XF9F-2 Panther, with short square-tipped wings which fold for shipboard storage, made successful flight tests.

First jet-propelled airliner made a successful 20-minute test flight in England.

Construction was started on the "N" blimp, world's largest non-rigid airship.

Four-jet fighter, the Blackhawk, designed to be usable under extreme weather conditions, passed extensive tests.

Caroline Mars, largest flying boat in active service, passed rigid tests carrying a payload of 35,000 pounds.

Fast, tiny, jet fighter-plane, small enough to be carried within the belly of a giant bomber, was developed.

Carrying plane was built to fly with or without a large, detachable compartment for troops or cargo carried under its belly.

Hydro-flaps installed on the belly of a plane's fuselage promised safer forced sea landings by land-based patrol planes.

Lengthened hull for flying boats improved materially their performance.

Amphibian airplane, the Navy 61-foot XJR2F Albatross, equipped with boat-shaped fuselage and wing floats for rough-water operations, made successful test flights.

British helicopter, having normal plane tail with twin rudders and stub wings, made its first flight; British-built helicopter with three rotors was designed to carry 24 passengers or three tons of cargo.

All-metal cargo glider plane, capable of carrying four tons of freight in addition to its two-man crew, was completed.

Endless belt conveyor system in five seconds dropped 12,000 pounds of cargo from plane rear during flight.

Radar, developed for use in foggy weather, successfully guided planes through dust storms.

ANTHROPOLOGY AND ARCHAEOLOGY

Believe Man-Like Apes May Have Been Ape-Like Men

Man-like apes of South Africa, Pleistanthropus, may have been ape-like men instead, since restorations of brains to fit their skull cavities show brains bigger than those of modern apes; an upper right leg bone found in South Africa was latest link in evidence that man-ape walked erect.

Bones of ancient African apes indicated that the animals got about by walking and running instead of swinging from branch to branch.

Huge near-human beings twice the size of modern gorillas but much more man-like lived in South Africa, discovery of a lower jawbone containing a large number of enormous teeth showed.

Pre-human race of pygmies who weighed about 100 pounds, lived in caves, and used fire was indicated by broken piece of skull with definite human characteristics found amid bits of charcoal in a South African cave.

Actual footprints made by prehistoric man 15,000 to 20,000 years ago were found in a cave in France.

New-found stone implements indicated that the Egyptians were in Sinai from the earliest development of their civilization in the Nile valley; the peninsula was inhabited

successively by Neandertal and Cro-Magnon men of the Old Stone Age, tribes of Neolithic or New Stone Age date, and a people of the transition period between Neolithic and beginning of Age of Metals.

Neandertal hunters prowled North Africa during the Ice Age of Northern Europe, human teeth and part of an upper jaw discovered in a cave near the Strait of Gibraltar showed.

Beautifully flaked weapons of flint indicated that a race of prehistoric hunters, named Atarians, hunted elephant, rhinoceros and giraffe in North Africa some 75,000 years ago.

Polished stone implements of Late Stone Age men were found together with fossil animals in the Faiyum Desert near Cairo, making it possible to reconstruct the life and conditions of this period.

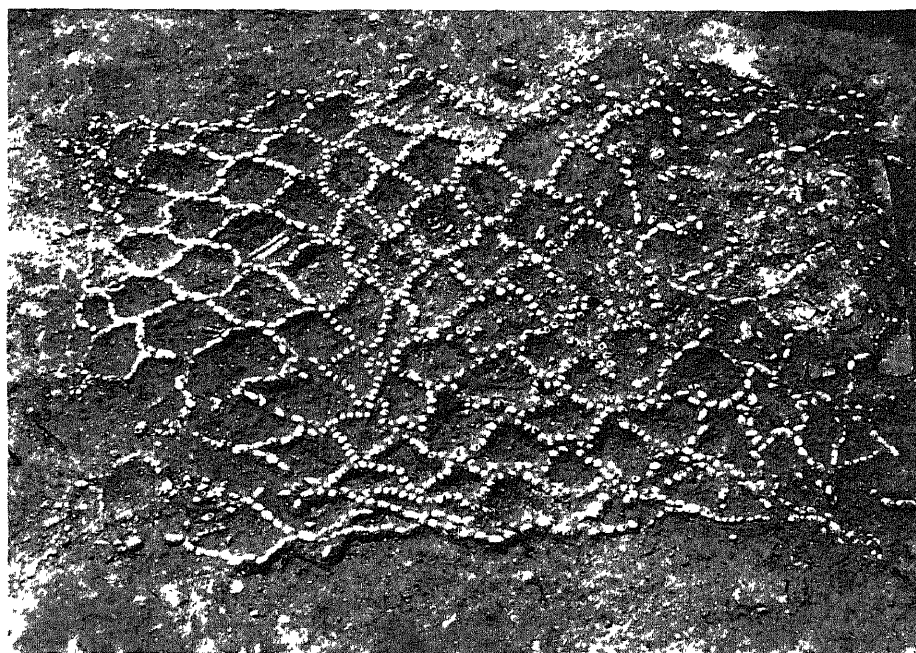
Two Stone Age skeletons, first found in the area, and tools were recovered from the west side of Lake Rudolf in Turkana Province, Africa.

Pottery fragments tempered with fiber, apparently representing the birth of ceramics among Indians of southeastern United States, were uncovered along the Savannah river in Georgia and South Carolina; traces of more than 150 Indian habitation sites, from prehistoric moundbuilders to pre-Columbian Creeks, were found in the area.

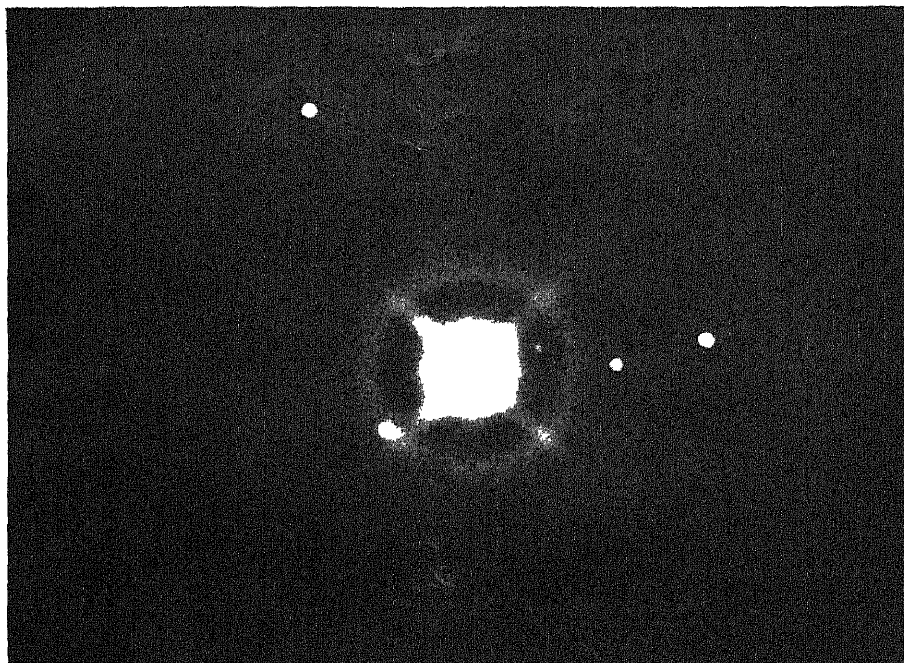
An enclosed rectangle of post-holes discovered near Little Lake in Inyo County, California, was believed to represent America's oldest house, with a possible age of 10,000 to 3,000 years.

Temple of inhabitants of England 2,500 years ago is apparently a small wooden replica of the basic design of temples in far-off Greece, it was reported.

Prehistoric Indian baby blanket, extensively decorated with over 1,500 beads, was discovered near Frankfort, Ohio.



EARLY BABY BLANKET—Heavily beaded with small shells, the miniature blanket is the work of prehistoric Indians.



URANUS AND FIVE MOONS—At top left are Oberon with Ariel below; Umbriel and Titania are at the right. The new, fifth satellite, of 17th magnitude, is shown close to the planet, inside the halation ring. The fifth moon is at a mean distance of 81,000 miles from the planet Uranus. Dr. G. P. Kuiper, of Yerkes Observatory, discovered this moon with the 82-inch McDonald reflector at Fort Davis, Texas. This picture was taken March 1, 1948, with an exposure of $3\frac{1}{2}$ minutes.

Excavations at Eridu, probably the oldest city of ancient Babylonia, yielded extensive remains of the Ubaid period, most important being a series of temples which proved the existence of monumental architecture early in the Chalcolithic age.

Megalithic tombs in the Mysore state of India were for the first time associated with datable cultural remains in a town site, and can now be safely dated to about the last three centuries B. C.

Shield of hammered bronze with hundreds of various-sized indentations forming 21 systems of ornamentation, estimated to have been made some 2,700 years ago in northern Italy, was uncovered on the island of Falster, Denmark.

Buried ruins of a temple of Dionysos, ancient Greco-Roman wine-god, were uncovered near Cologne Cathedral, Germany.

Crosses and inscriptions in both Hebrew and Greek on burial caskets found near Jerusalem were interpreted as the earliest records of Christianity.

Well-preserved manuscripts found in northern Palestine proved to be complete text of the book of Isaiah, commentary on the book of Habakkuk and manual of discipline of some sectarian Jewish group, all dating around the beginning of the Christian era.

Pit-houses with cupboards cut into the earthen walls and decorated utensils discovered in New Mexico closed the gap between A.D. 500 and 900 in the known history of the long-vanished Mogollon Indians of the Southwest.

An immense key to the main gate, hammer of unique design and pair of well-preserved iron handcuffs were unearthed in

the ruins of a Danish castle gutted with fire more than 600 years ago.

Skeletons of six deaf Indians who lived in California a few hundred years ago were recovered along with thousands of artifacts such as fishhooks, harpoons, awls, mortars and pestles.

Outlines were located of the fort built in 1587 and then mysteriously deserted by Sir Walter Raleigh's "lost colonists" at Roanoke Island, N. C.; it has bastions on the sides of the basic square rather than on the corners.

Testing for radioactive carbon the ashes of a person who died anywhere from 900 to 30,000 years ago was reported to be an accurate method of dating ancient archaeological sites.

Ancient Babylonian cuneiform inscriptions were made legible by baking the ancient tablets for a day at a temperature of 1,400 degrees Fahrenheit.

Descendants of Europe's first farmers look much like their ancestors who came to Greece from Asia Minor 6,000 years ago, comparison of skeletal remains discovered in the region with head and body measurements of local farmers showed.

Blood study of the Basques of northern Spain indicated that they have nearly pure Rh negative blood, which means that they are racially not mixed with other European peoples that carry the Rh positive gene.

Cannibalistic Carib Indians of the West Indies were reported to have had different languages for the two sexes, women using the "man language" when speaking to the men.

Science News Letter, December 18, 1948

ASTRONOMY

Heavenly Bodies Studied With Radar and VHF Waves

Radioastronomy, new branch of astronomy, used radar and other high frequency waves to study meteors, the sun and distant stars.

Giant 200-inch telescope was formally dedicated, conspicuous advances made in its final adjustment, and peeks were taken deeper into cosmic space than ever before possible.

Fifth moon of the planet Uranus, that completes its path around Uranus in 30 hours, was discovered well within the orbit of the planet's four previously known satellites.

Nine white dwarf stars were discovered, bringing to 100 the number of superdense and degenerate stars.

Brilliant meteors, called fireballs, exploded over Alabama, over Kansas and neighboring states.

Gigantic stony meteorite fragment weighing over 2,000 pounds, discovered in Norton, Kansas, following an intensive search due to the Kansas fall of Feb. 18, is the largest known aerolite and largest meteorite of any type ever observed to fall.

Fluctuations of a star's magnetic field were estimated to account for hitherto unexplained intensities of certain spectral lines in some white stars.

New comets discovered include Mrkos, Wirtanen II, Keuskamp, Pajdusakova-Mrkos, Honda-Bernesconi, Wirtanen III, Ashbrook-Jackson, Johnson, Wirtanen IV, 1948 I, Bester V and Honda III; periodic comets Forbes and Neujmin were rediscovered.

Small amounts of ammonia and methane, and two separate isotopes of carbon dioxide, were detected in the earth's atmosphere, the sun being used as the light source.

Infrared heat-light reflections from Mars indicated possibility that mosses and lichens exist on that planet.

Rings of Saturn and the planet's inner satellites were pictured as consisting of a thin layer of hoar-frost covering a very cold surface, perhaps solid ice, following discovery that the spectra of Saturn's rings and inner satellites resemble that of a thin sheet of ice.

Photoelectric photometer was made more sensitive to light in near infrared region of sun's or star's spectrum by cutting down the circuit capacity.

New minor planet was found to be one of only three or four asteroids known to have come within the earth's orbit.

A "nova" or new star was found in the constellation of Cygnus the swan, and two were reported in the constellation of Serpens the serpent.

Variable star of the Beta-Cephei type was found through use of the photoelectric photometer to increase suddenly one magnitude in brightness, then fade to normal in 15 seconds.

Fifteen of the brightest blue stars in the Pleiades cluster were found to rotate with velocities averaging 102 miles per second, one having at its equator a speed of 136 miles per second.

The moon was reported to have a small but detectable effect on the degree of ionization of the earth's upper atmosphere.

Clouds of ionized air were found to be

drifting during the night at the height of the low-level layer which is uniformly ionized in the daytime.

Meteors ionize the earth's atmosphere in thin sheets, radio observations showed.

Point in the direction of the constellation Cygnus, broadcasting 1,500 times more energy to the earth than any point in the surrounding area, was found to send noise of constant intensity at about 100 megacycles frequency and above, noise of varying intensity at frequencies below 100 megacycles.

Multiple expeditions to Burma, Siam, China, Japan, Korea and the Aleutians observed annular eclipse of the sun of May 8-9 to secure data for more accurate determination of shape and size of earth.

Abundance of the isotopes of the rare element gallium in a sample separated from a meteorite was found to be the same as in ordinary gallium.

Parent planet from which meteorites were formed was born less than 60,000,000 years ago, study of uranium and thorium in meteorites indicated.

New commissions on microwave research, close binaries and astronomical history were set up by the International Astronomical Union at its first session in ten years.

Nebulae were reported as possibly lighted by clouds of gas bumping into interstellar dust.

Small, red stars embedded in a dust cloud were stated to grow fat on dust particles falling into them from the cloud, while luminous blue and white stars in the dark nebula repel the dust by outward pressure of their strong light.

Interstellar matter was reported to have the same relative abundance of elements as normal stars.

BIOLOGY

Human Eggs Were Fertilized in Test-Tubes

Human ova or eggs were fertilized in a test tube with human spermatozoa, and fertilization, demonstrated by initiation of cell division, took place in at least four of the ova.

A rat egg can be fertilized when less than one hundred male sex cells are present; rabbit ova need a thousand spermatozoa, experiments of importance for artificial insemination in the livestock industry showed.

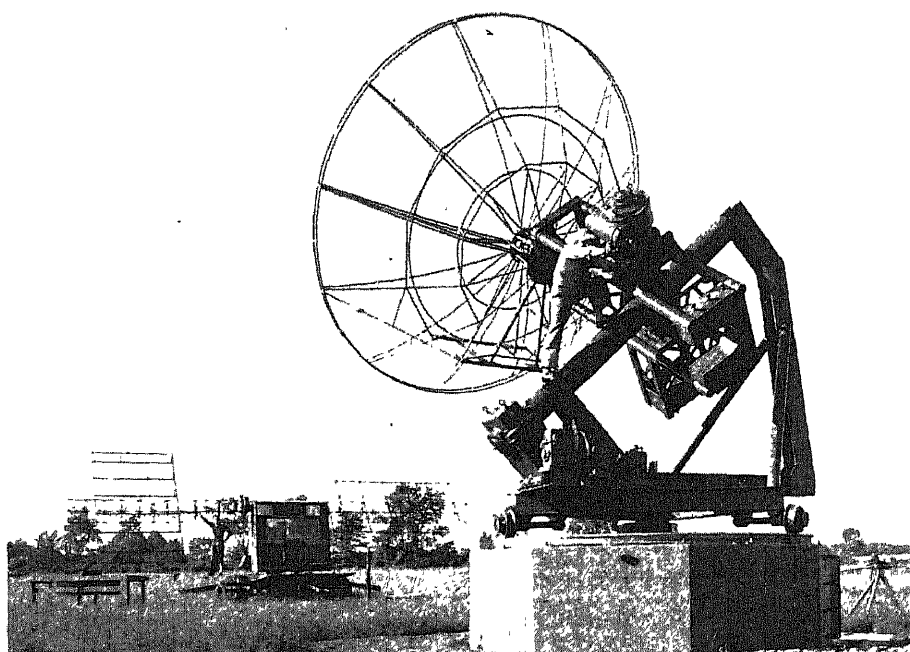
Eggs started in the body of one hen were transferred to another, fertilized, and finally laid and hatched.

Progesterone, hormone long supposed to be found only in mammals, was detected in hens.

Chicken and turkey eggs hatched, and fertilized mammalian ova developed into normal embryos after hours of chilling at near-freezing temperatures.

Heavy water and salt tagged with radioactive sodium showed that a newborn baby is 74.6% water, a little more than half of this water being in the blood and the cells that make up the body, while the rest lies between and about the cells and in the body spaces.

Radioactive elements showed that sodium in the salt of blood and other tissues is



RADIO TELESCOPE—This eight-ton machine, with its 17-foot saucer-shaped antenna, is nearing completion at Cornell University. It will follow the sun automatically to record solar "noise" which interferes with radio reception at ultra-high frequencies.

supplied before birth in superabundance across the placental membranes; by the twelfth week of prenatal life, the fetus receives 160 times as much sodium as the growing tissues require.

Animals' stomachs are able to digest food long before birth, experiments proved.

Sex evolution, found through study of "sexless" cells, was reported to proceed in four steps: nuclear division in the cell without the cell itself dividing, evolutionary changes in the two that rendered each less efficient without the other, halving of the chromosome numbers within the body cells, and union of the two incomplete cells.

Between 20,000 and 42,000 of the heredity-determining units called genes were estimated to exist in each of the tiny cells which form a person's body.

Upholders of neo-Lamarckian doctrine scored official triumph over Mendelian scientists in the USSR.

Use of radioactive carbon as a tracer element identified the last two intermediate compounds prior to sugar formation by green plants as phosphoglyceric acid and triose phosphate, itself a simple sugar.

Radioactive carbon revealed a mysterious Factor B, unidentifiable as any known chemical, as the first material manufactured by living plants through the energy of sunlight; it showed that green leaves can add together the two simple sugars, glucose and fructose, to form cane sugar.

Cousin to DDT, methoxychlor was developed that does not poison man and animals, yet slays insects untouched by other insecticides.

DDT in meat was found not to be destroyed by cooking.

DDT-resistant flies were raised in the laboratory through more than 30 generations.

Houseflies that survive standard doses of DDT but are killed by other insecticides were found in nature.

New viral agent, BFS-867, was reported to be a "stem" virus from which are descended other sleeping sickness viruses, such as western equine and St. Louis encephalitis viruses.

Strange virus disease producing arthritis in chickens before they are hatched was reported in the eastern states.

Growth hormone, obtained as a pure substance from the pituitary glands of slaughtered cattle, built both bones and muscles of rats to more than twice normal size.

Small amounts of poisonous carbon monoxide are converted into harmless carbon dioxide in the living body, experiments with frogs and mice showed.

Laboratory world free from radioactivity was created for highly pedigreed mice, rats, rabbits and guinea pigs.

Germ-free chicken hatched from germless laboratory egg produced by mating of germ-free parent birds marked the first time that germ-free life in birds was carried into the second generation.

Success was reported in making such "impossible" grafts as sweet clover on sunflower, cowpea on tomato, and tomato on geranium.

Discovery of a tomato plant that is unable to shed its pollen simplified hybridizing these plants.

Strains of hybrid corn with high content of niacin, the pellagra-preventing vitamin, were produced.

Certain concentrations of the highly potent insecticide gammexane, or 666, were found to cause sudden hereditary changes in the plants it protects unless meso-inositol, member of the vitamin B group, is used

along with it.

Seedcorn and cotton seed exposed on the decks of target ships to atom-bomb rays released by first Bikini burst produced plants with many abnormalities.

Evolutionary changes were produced in fruitflies by low concentration of formaldehyde, in wheat and barley by radioactive phosphorus, in both plants and flies by ultrasonic sound waves.

Weed-killer 2,4-D caused roots to grow from infant leaves inside a garden bean.

Vegetables sprayed with a dilute solution of a growth-control chemical related to 2,4-D stayed fresh after lying in the open for more than a week.

Presence of the weed-killer 2,4-D in extremely small amounts was detected by chemical test using a few crystals of chromotropic acid.

Building blocks of proteins were found to be just as valuable foods as the proteins themselves by feeding rats both a natural protein extracted from milk and a mixture of the natural amino acids of which it is composed chemically.

Rabbits and guinea pigs fed an exclusive diet of powdered milk failed to grow and developed cirrhosis, or gin-drinker's liver.

Dogs in the United States, Britain and Sweden suffered from a new and highly fatal disease caused by a virus.

Mysterious X disease of unknown origin attacked cattle in all sections of the United States, causing them to lose weight, give less milk and drop calves prematurely.

Nest of the bristle-thighed curlew, never previously seen, was found near Mountain Valley in southwestern Alaska.

Hibernation through eight months of the

year by Alaskan ground squirrels was reported.

Leaf-hoppers were found to carry western elm disease virus that kills many trees in the Midwestern and Southern states.

Outbreaks of Dutch elm disease were reported far to the west of Ohio, long thought to be its western limit.

Improved live virus vaccine was reported not only to protect hens against Newcastle disease but also to give their chicks immunity.

Experiments proved that all living things accumulate radioactive carbon, C^{14} .

Report that worms spread the germs of at least three animal diseases—blackhead of turkey, salmon poisoning of dogs and influenza of swine—may help clear the mystery of how some diseases spread.

Ammonia is preferred to straight nitrogen from the air by nitrogen-fixing bacteria that live in root nodules of clover, beans and other leguminous plants, experiments with the rare stable isotope of nitrogen showed.

Yeast that produces large amounts of fatty material was found.

New antibiotic named actidine, from the same fungus that produces streptomycin, was found deadly to some of the fungi that cause plant diseases.

Antibiotic of the same family as penicillin and streptomycin was obtained from *Bacillus* larvae, germ that produces the serious disease of infant bees known as American foulbrood, either by direct extraction of the "scale" which it causes or by culturing on a nutrient medium.

Cancer cells were transformed to normal cells by transplanting a cancer from a frog

into the limb of a salamander.

Living cells do not have to be intact for protein synthesis to be carried on, research with broken-down walls of living liver cells and radioactive glycine showed.

Radioactive cobalt compound given to a cow showed that a fraction is used in making new blood, the rest rapidly eliminated.

Chemical called trichothecin, produced by a fungus, stopped the spread of other fungi by preventing them from reproducing.

Human saliva prevents some seeds from germinating and checks the growth of those that do sprout, experiments demonstrated.

Weevil infestation in wheat was detected by soaking samples of suspected grain for a few minutes in a dye containing acid fuchsin.

Penicillin was shown to paralyze the general protoplasm of bacterial cells rather than stop nuclear division; sodium penicillin was found to imprison germs in an impenetrable layer of colloid, keeping them from foraging for food or multiplying.

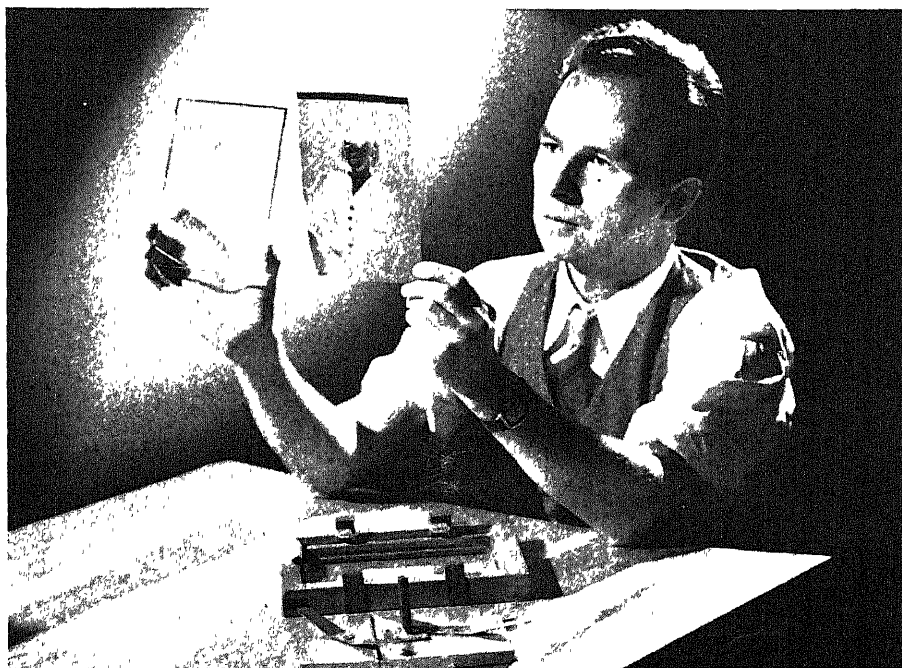
Scales that cause wool fibers to cling together consist of at least a double layer, according to a new, simple technique for "fingerprinting" wool.

Campaigns against rats, carried on with increased vigor this year, were credited with decline of typhus fever cases and saving precious grain.

ANTU, drastic rat poison, was reported literally to drown rats in their own body-fluids by causing lungs to become filled with watery liquid.

Seed of China's recently discovered "dawn redwood" were brought to the United States.

Use of new strains of hybrid corn developed for Mexico made that country independent of foreign import in 1948.



PHOTOGRAPHS PRINTED IN GLASS—This is done by a new process that uses an ordinary negative and ultraviolet light, then heat, to create a positive permanent picture. Dr. Donald S. Stookey of Corning Glass Works is shown examining a negative and a piece of photosensitive glass before he inserts them into the printing frame on the table.

CHEMISTRY AND PHYSICS

Artificial Meson Was Created for First Time

Elusive cosmic-ray particle, called both meson and mesotron, was created artificially for the first time by accelerating hearts of helium atoms to energies of 400,000,000 electron-volts in a cyclotron.

Tracks of heavy nuclei in cosmic radiation were captured by photographic plates carried aloft by balloons.

Electron tracks about two thousandths of an inch long were captured in a special photographic emulsion.

Special photographic emulsion, containing eight times as much silver bromide as older emulsions, was developed to photograph the path of mesons.

Alpha particles given off from radioactive elements made stars with two to five rays in special photographic plates left in contact with the flat surfaces of rocks, indicating that the amount of uranium and thorium in rocks may be estimated photographically.

New subnuclear particle, bearing a magnetic charge instead of the more familiar plus or minus electrical charge of the proton or electron, was predicted; while not yet observed it is needed to explain why all electrons carry the same unit amount of negative charge.

Through use of rocket-carried Geiger counters, intensity of cosmic ray bombardment was found to be constant from 30 to

100 miles above the earth's surface.

World's first samples of metallic technetium, chemical element number 43, were isolated.

Chemical compounds, such as certain acids and alcohols, containing atoms tagged with radioactive elements were offered for sale by the U. S. Atomic Energy Commission.

World's greatest atom smashers were planned, including two gigantic synchrotrons to operate at up to seven billion electron volts and a linear accelerator, capable of hurling electrons with a billion volts of energy.

Microwave spectroscopy, using waves of the same length as radar, detected tiny amounts of chemical elements in the body without use of hazardous radioactive isotopes in those cases where the element ended up in the skin, hair, nails or other detachable area.

Heavyweight hydrogen, also called tritium, the only radioactive isotope of this element, and lightweight helium, each with the atomic weight of three, have been produced in quantity for the first time in the atomic pile.

Sixth isotope of oxygen, radioactive O^{14} , was produced by atomic bombardment.

Production and measurement of radioactive properties of hitherto missing 4n-1 mass type radioactive family, named neptunium family, was accomplished.

New radioactive series of protactinium was produced by deuteron and helium bombardment of thorium.

New types of electrical semiconductors were produced by bombarding pure germanium metal with deuterons and other particles accelerated to 10,000,000 volts.

Chlorophyll, green pigment in plants, comes in almost ultra-microscopic little disks or wafers, held together in groups of 40 to 60, electron microscope studies showed.

Talc was produced in the laboratory by heating a mixture of magnesia silica and water to 1,300 degrees Fahrenheit under pressure of 30,000 pounds per square inch; several other naturally occurring silicates were produced experimentally.

Quartz crystals more than an inch long were produced by placing silica and a small quartz crystal in an alkaline solution inside a steel bomb, then heating to 750 degrees Fahrenheit at a pressure exceeding 15,000 pounds per square inch.

Synthetic resins were improved so that they purify water by simultaneously removing both acid and alkali chemicals.

Use in respirator apparatus of a higher oxide of potassium, with the ability to absorb carbon dioxide and moisture and give off life-sustaining oxygen, enabled a man to carry his own atmosphere along with him.

Synthetic glycerine was made directly from petroleum, making its production independent of the supply of fat available.

First completely synthetic varnish was prepared through several chemical steps from propylene gas, abundantly available from cracking oil.

Varnish composed of alizarine-calcium rosinate and linseed oil, with turpentine as the solvent, was reported to duplicate that used on famous old violins.

An acoustical interferometer, consisting of two quartz crystals with gas confined between them, was developed to detect invisible infra-red light by means of sound

too high-pitched for the ear to hear.

Infra-red wavelengths up to 39 microns were measured by means of a prism made of thallium bromide and thallium iodide.

Color "staining" with light waves was made possible by new developments in phase microscopy, permitting living cells to be observed without killing them.

Living viruses of parrot fever and smallpox vaccine, and *Leptospira*, tiny organisms which cause some types of jaundice and the swamp fever of eastern Europe, were examined with a phase microscope.

New method of cementing lenses, and in some cases filters, to light-sensitive cells made possible more accurate light and exposure meters.

Device invented to measure atomic radiation by changing it into light consists of a simple box containing fluorescent matter and a photo-electric cell surrounded by dry ice.

Method was developed by which neutrons could be used to photograph the positions of atoms in crystal lattices.

Hydrogen atoms restlessly jump from one position to another in the crystal structure of a piece of ice, photographs of a stream of neutrons scattered by passing through an ice-crystal showed.

Electrical charges on their particles were found to enable certain soapy chemicals called detergents to prevent the curdling of paint, cosmetics and other preparations.

Atoms are pushed out of place in smashed metal, measurement of the amounts of X-ray energy scattered by the atoms in deformed and normal metals showed.

Super-tops, suspended in vacuum by magnetic force, were made to spin 633,000 turns a second.

Movements of as little as a hundred-thousandth of an inch were detected by use of a "transducer," new instrument consisting of a coiled spring whose turns separate one by one when the ends of the spring are pulled apart.

Development of a super-strong wire, produced through heat treatment and exceptionally long and exacting cold working, made possible an octave above middle "C" on the tenor banjo or tenor guitar.

Compound of phosphorus and tungsten known as phosphotungstic acid showed where in the cell the greatest concentrations of proteins occur by making the parts opaque to X-rays.

Low temperature of five one-hundredths of a degree above the unattainable absolute zero of 459 degrees below zero Fahrenheit was reached through use of a magnetic cooling device.

Chemical compound which forms a third link in the chain leading to production in the body of the pellagra-preventing vitamin was discovered and synthesized.

Urushiol, blistering compound of poison ivy, was successfully imitated for research purposes in a synthetic compound that resembles the natural product not only in basic chemical structure but in physiological effects.

Five to eight times more protection against sunburn than that given by any compound now in use was promised by ethyl-p-diethylaminobenzoate and methyl-p-dimethylamino-benzoate, compounds that can be applied in lotions, ointments or solutions.

Nobel prize in physics was awarded to Prof. P. M. S. Blackett of Britain's Manchester University for discoveries in the

field of cosmic radiation; in chemistry to Prof. Arne Tiselius of the Institute of Physical Chemistry, Uppsala University, Sweden, for new methods of separating, detecting and analyzing colloids.

EARTH SCIENCES

125 Major Earthquakes Recorded on Seismographs

There were 125 earthquakes of sufficient strength to record themselves on seismograph instruments so they could be immediately located; death and destruction were caused by severe earthquakes in the Philippines on Jan. 24, in southern China on May 25, and in Japan on June 28.

Supposedly extinct geyser erupted in Yellowstone Park.

An erupting volcano on the tiny Philippine island of Camiguin sent thousands of persons fleeing.

Volcanoes roared in northwestern India 250,000,000 years ago, it was indicated by discovery of the split half of a volcanic bomb in the same slate formation as fossils formed during the geologic period following the Coal Age.

Specimens of therapsida, a "missing link" between reptiles and mammals, were unearthed in South Africa.

Criteria were set up for determining the anatomical characteristics and general appearance of any extinct animal on the basis of its fossil tracks alone.

Sixty-million-year-old fossils, dating back to the last days of the dinosaurs, were turned up in quantity by scientists surveying areas to be permanently flooded by a series of more than 100 dams planned and under construction on the Missouri River and tributaries.

Whale ancestors, meat-eaters that were slenderer and smaller than modern whales, were recovered near Cairo in the region of the Faiyum Desert, floor of the ancient Tethys Sea.

Two 50,000,000-year-old fossil skulls of lemuroid animals, relatively near the bottom of man's family tree, were found in Wyoming; large eye-sockets directed almost straight forward indicate they were night-prowlers.

Giant fossil turtle with a shell seven feet long and four and one-half feet wide, was dug from between two layers of lava flows representing the bottom of a lake in Africa existing about 25,000,000 years ago.

Bikini atoll has been a-building for more than 20,000,000 years, holes drilled over 2,550 feet into the submerged coral-covered mountain showed.

Determination of the amount of heavy oxygen in the fossil skeletons of squid-like animals was reported to indicate the temperatures of the ancient seas in which these animals lived.

Mountain systems were reported created by atomic energy, working slowly through millions of years, that bulge the earth's crust up into immense blisters, which subsequently collapse, with vast magma flows.

When much of the earth was covered with ice about 50,000 years ago, California was inhabited by some sort of human beings, remains of fires, tools and discarded shells indicated.

Fossil pollen in 185 bogs in northeastern North America indicated alterations of warm, dry and cool, moist climate since the

last great advance of the Wisconsin Ice Sheet.

Enormous pile of bison bones discovered near Heart Butte, N. D., may have resulted from an old Indian method of slaughter by driving a whole herd of bison over a cliff.

Two gravel deposits were discovered in the Grand Canyon area 3,500 to 4,000 feet above the present river level.

Ancient waterfall, at least 150 feet high, found in the Connecticut River Gorge was reported to have served as an outlet for water from a huge lake which 20,000 years ago covered much of the modern river valley.

Great canyons four to five thousand feet deep were found in the sea floor off the coast of New Guinea; a tremendous under-sea cliff about two miles high was discovered in the Antarctic.

Gulf stream, considerably narrower and swifter than supposed, meanders like a great river, use of the radio-navigation aid Loran showed.

Photographs of the ocean bottom were taken 3.5 miles beneath the water's surface.

Storm centers thousands of miles away were detected and their speeds and directions analyzed by an instrument that sorted out and analyzed the large and small ocean waves they created.

Plentiful supply of titanium minerals was located in inland Clay County, Florida, where it can easily be mined.

Single-cell helium-filled plastic bag was developed to carry 70 pounds of self-recording scientific instruments 20 miles above the earth's surface to record temperatures, atmospheric pressures, cosmic ray intensities and solar radiation.

More accurate meteorological data were provided from high above the ground by an improved radiosonde tracked in flight by a ground-based automatic direction finder.

Temperatures of 260 degrees Fahrenheit at a distance of 100 miles above the earth's surface, 150 degrees below zero 45 miles up, 70 degrees above at 35 miles altitude and 75 degrees below zero eight to 20 miles high were estimated by means of one of the world's largest explosions, that of 5,000 tons of TNT.

Death Valley in California was verified as the hottest spot on the North American continent, with a temperature of 180 degrees Fahrenheit on the desert floor one day in every seven years, and a top temperature of 134 degrees at five feet above the ground.

Annual iceberg "census" was for the first time made from the air.

Additions to the U. S. Weather Bureau's daily weather map included extension of the main map up to latitude 55 degrees, enlarged inset map showing previous day's conditions for the entire North American continent, and new inset map to show altitudes at which an atmospheric pressure of 700 millibars exists.

ENGINEERING AND TECHNOLOGY

Magnetic Oil Particles Used in New Fluid Clutch

Oil containing millions of tiny particles of iron powder or other magnetic material made possible a new fluid clutch consisting of only three parts—driving shaft with a



SMELL-PROOF ROOM—Testing for odors, Dr John V. Haralson of Cornell University sniffs an isolated odor from an "olfactory stimulator" while the long glass tube carries off his exhaled breath. The fibreglas envelope in which he is garbed and the equipment in the chamber were designed by Dean Foster, at left.

plate at its end, driven shaft and plate, and iron-saturated oil between.

Bit of semi-conducting germanium metal that amplifies current without the complexity of plates and filaments made possible more stable and durable radios, television sets and electronic devices.

Vacuum tube using cesium metal both as coating for the hot cathode and as current-carrying vapor was developed for changing alternating into direct current.

Electric current shot at a diamond chip was amplified as much as 500 times by new method based on discovery that electric currents produced by beams of electrons hitting an insulator may be increased several hundred times.

"Cold" rubber was synthesized at almost freezing temperatures, giving better wear to the rubber.

Fiber to supplement nylon, made from acrylonitrile and trade-named orlon, was announced for early commercial production.

Carefully controlled experiments to produce precipitation artificially from winter layer-type clouds by seeding with dry ice pellets generally were unsuccessful; rain was not produced unless already occurring naturally within 30 miles of the seeded area.

Man-made snow was produced on a continuous basis in sufficient quantities in climatic test chambers to test military equipment under simulated Arctic conditions.

Vapors in a laboratory changed hexagonal snow into four different, recognizable shapes.

Silver iodide smoke particles, created by fire in special burners, was tested as a tool for making artificial snow and rain.

New type of dry battery used oxygen from the air instead of from chemicals within it.

Tiny cells that interlock automatically to form a miniature dry cell battery, eliminating the need for wire connections and the necessary soldering, were revealed.

Flawless glass was produced by heating with an electric current passed through the glass.

New type of glass that can be heated to 1,800 degrees Fahrenheit and rapidly cooled without breaking consisted almost entirely of silica.

Depth of fine film on liquid surface was determined by an instrument which measures the minute distortion of polarized light reflected off the surface.

Surface layers of metal less than a quarter-millionth of an inch thick were studied by an electron diffraction instrument that shoots beams of electrons through the thin sheet of metal.

Four tiny, hollow silver balls measured direct and reflected heat to show how really hot a person gets in summer.

Instrument using the positive ion emission from a hot platinum surface operating in air detected certain classes of invisible vapors and air-borne particles, including some without odors.

Monitoring device using a new type of electronic circuit detected a difference of five electrical impulses in a million, checked up on amplitude of broadcast waves and power being transmitted.

Electrical meter of the watt-hour type, requiring little checking, was made with its rotor suspended in air by magnetism.

Impurities in a metal, as little as one part in a million, were detected and weighed by a mass spectrometer set to record an impurity with a specific atomic weight.

Detector for poisonous lead in the air warned of atmospheric contamination in a manner similar to a Geiger counter.

Camera shutter capable of operating at a rate of 100,000,000 frames per second was revealed.

Camera that develops moving photographic paper or film four seconds after the picture is snapped was developed.

Photographs were printed in, not on, glass by using ordinary negative and ultraviolet light, then heat, to create a positive permanent picture.

Exposure time for taking X-ray pictures was cut in half by use of a new high-speed X-ray intensifying screen.

Completely dry process for taking pictures and printing, called xerography, uses static electricity and dry powders instead of chemical solutions.

Pictures taken with a camera installed in a V-2 rocket showed how a great part of the western United States and Mexico looks from some 60 miles above the earth.

Water-cooling of carbon arcs was found to make possible a steady arc of high brilliancy with lower carbon consumption.

Three separate color images were produced on a single layer of standard black-and-white film from three color separation negatives by a new process.

Television, radio relays, facsimile and photography were combined in a new communication system called Ultrafax that reproduces at television speed a full page of printed matter with illustrations.

Sixteen-inch receiving tube for home television sets, made largely of metal, was manufactured on a continuous production basis.

Permission was requested of the Federal Communications Commission for a television relay station nearly six miles above the earth, "stratovision" having been successfully demonstrated.

Twice as many radio-phone stations operated without interference by use of radically simpler single-sideband radio transmitter.

Automatic telephone accounting system which records the number of the sending phone, the receiving phone and length of the conversation was revealed.

High speed weaving machine, in which light-weight steel gripper shuttle replaces wooden shuttle and steel guides keep the shuttle from touching the warp yarn, produced cloth 2.66 times as fast as conventional machines.

Hard, white ice in a continuous column was produced by a new ice-making machine that first freezes the center core of water, then forms successive layers of ice around it.

Fluorine and chlorine make up by weight four-fifths of a new plastic that is an unusually stable, high-temperature, chemical-resistant material.

Alkyd molding compound, a new mineral-filled plastic, was used on electrical conductors and switch units.

Oil from tobacco seed was found a better ingredient for rosin varnishes than the established linseed oil.

A 75% yield of paper pulp was obtained from hardwoods by treating the oak, hickory and other trees with soda ash and sulfur dioxide; melamine-formaldehyde was found to give needed strength to paper made from such trees as poplar, beech, and birch.

Combination fungicide and shoe dressing for leather goods protected it from mildew

and other fungi.

Chemical process developed for tanning leather consisted of first treating the prepared hide with a compound of the dialdehyde type, then with resin-forming agents.

A thousand numbers were stored in a pint of mercury, "memory" unit developed for high-speed electronic computers.

Up to 1,600,000 sheets of paper were counted in one second by a simplified electronic counter.

Jellied gasoline was used to crack rock thousands of feet underground to permit the flow of oil to the well-holes; modified bazooka was used to perforate oil well casings to increase petroleum flow in partly exhausted oil wells.

Radio signals of very high frequency were amplified by an electron wave tube that projects stream of electrons down a tube inside a spiral conductor.

Threads of screws, nuts and bolts were standardized by agreement signed by United States, Canada and Britain.

Improved seismic method of locating probable underground oil was revealed which uses overground shaped-charge technique, eliminating the cost of drilling shot holes.

MEDICINE

Penicillin Pill Found To Prevent Gonorrhea

Announcement was made that gonorrhea could be prevented by swallowing a single pill of penicillin a few hours after exposure.

Laboratory animal experiments indicated that cancer-destroying radioactive iodine could be tagged to a chemical which goes directly to the part of the body desired, the kidney in this instance.

Development of a technique for taking photographs of living body cells under ultraviolet light held out hope for an improved way of telling a cancer cell's composition.

A new high-speed camera which requires one-twelfth the exposure to X-rays necessary with older equipment was reported as showing promise of saving victims of stomach cancer by making mass X-ray detection studies possible.

Cancer-causing chemicals were found to produce the sudden evolutionary changes known as mutations, and the opposite possibility was suggested, that mutation-causing chemicals may cause cancer.

Radioactive cobalt for low-cost cancer treatment underwent tests at four institutions.

Preparations of radioactive yttrium, zirconium, columbium and lanthanum were made for use in selective radiation treatment of certain tissues and organs, such as liver, spleen and bone marrow.

Treatment of cancer with high frequency sound waves was investigated.

New operations for heart disease patients were: creation of a new artery leading off the aorta; cutting off the top of the heart to prevent clots plugging blood vessels elsewhere in the body, and wrapping the aorta in plastic to prevent its bursting.

Experiments with rats revealed that the body may be able to manufacture some vitamins from proteins if it does not get enough vitamins from food.

Two of the most vital centers of the brain controlling breathing and blood circulation were discovered in the medulla or bulb.

Radiocardiography, technic for studying the heart and blood circulation by injection of radioactive chemicals whose course through the heart is traced by an ink-writing Geiger-Muller counter, was developed.

Flies were definitely proved to be diarrhea carriers.

A common cold-causing virus, named V14A, was isolated.

Discovery of the deadly effect on germs of a relative humidity of 50% gave hope of a weapon against influenza, pneumonia, strep. sore throat and perhaps other diseases.

Chlorine dioxide was accepted officially as a flour bleach to replace nitrogen trichloride (agene) which had been found to cause fits in dogs.

The World Health Organization began full scale activity and the United States became a member.

More reliable syphilis blood test was made possible with the discovery of a new testing chemical, called cardiolipin, obtained from beef heart.

An X-ray telescope which gives doctors a 500 times clearer view than previously possible of the patient's internal organs was developed and showed promise of becoming a weapon for fighting stomach cancer.

Discovery that sputum or spit protects tubercle bacilli from streptomycin may be a clue to why the antibiotic fails against lung TB.

A long-range program during which some 15,000,000 children were to be vaccinated against tuberculosis with BCG, largest mass vaccination undertaking in history, got under way in 11 European countries.

Isolation of a blood chemical, serotonin, twice as powerful as adrenalin for fighting shock, was announced.

Asparagus was found to contain a substance called quercetin which stopped the poison production of the botulinus organism in test-tube experiments.

Penicillin-sensitivity was restored to resistant disease germs by briefly associating them with germs of another family.

A penicillin preparation that lingers in the body at an effective germ fighting level for four days after a single dose was made.

Streptomycin, given in conjunction with potassium iodide, was found more effective in the treatment of a late type of TB, fibrocaseous tuberculosis, in guinea pigs.

Radioactive iodine was reported to have a curative effect on toxic goiter.

A lethal dose of radiation was found to convert the blood system to an embryonic state.

An improved method for extracting proteins such as albumin and globulin from blood, which also eliminates the risk of transmitting jaundice virus in plasma, was developed by removing salts from the blood with ion exchange resins and pasteurizing the blood.

Method of safely injecting fat into the veins, designed for sick people who cannot eat much, was developed.

A new principle in the treatment of disease was suggested by the discovery that an anti-vitamin can interfere with the activity of a female sex hormone.

Handkerchief was found to be the most

important single agent for spreading germs with the possible exception of bed-making, and common aerial disinfectants did not appear to kill these germs.

Lead to possible prevention of diabetes in man came from rat experiments which showed that there is a pre-diabetic period without symptoms after the pancreas is removed.

Good results with inhalation of penicillin and streptomycin dust were reported in treating colds, chronic sinusitis and bronchitis, and in the prevention of lung infections following surgery.

A new protein was discovered in blood which is the fifth factor in clotting and has been named ac-globulin.

Evidence was presented that brucellosis, also called undulant fever and Malta fever, can be transmitted through the air.

Q fever germs were recovered from raw milk indicating that this may be one mode of spreading infection.

New diagnostic test for hookworm and fluke-caused sickness called schistosomiasis was devised to give a quantitative estimate of the number of eggs discharged by the worms and flukes.

Radioactive iodine and fluorescein dye were combined to make diiodofluorescein, successfully used in brain tumor detection.

Yellow jaundice puzzle was partly solved with the discovery that there are two kinds of virus, IH causing infectious hepatitis and SH, homologous serum hepatitis.

Discovery of an enzyme in the body, named insulinase, which rapidly destroys insulin, was linked to the cause of diabetes.

Common male frogs were found as good as more costly tropical ones in detecting early pregnancy in women.

First cure by streptomycin of a rare nose disease called rhinoscleroma was reported.

A test for a curable high blood pressure, caused by tumors which release adrenalin into the blood, has been devised with the new drug piperidylmethyl benzodioxane, or 933F.

Two new vitamins, B₇ which may have an anti-anemia effect and B₁₂ believed to control pernicious anemia, were discovered.

A new vitamin in wheat which increases natural resistance to infection in mice was announced.

A ten-year national health program was announced, at the core of which was national health insurance for all people.

Galactose, a special sugar found in milk sugar, helps the body utilize fats, research with rats revealed.

A change in the structure of a body chemical called a lipid during the development of skin cancer in mice was announced.

Germs of infantile paralysis and several other diseases were found to get into the drinking water by back-siphonage in the plumbing system and to survive there from one to seven days even when the water is chlorinated to the extent most city drinking water is.

Indication that there is no danger of "poisoned water" from an atomic bomb burst in or near the city water supply after the water has gone through a modern filtration plant was made.

Giving tocopherol, or vitamin E, to diabetic patients was reported to reduce their insulin requirements.

Globulin which agglutinates sensitized sheep red blood cells was found in the serum

of patients suffering with active rheumatoid arthritis; this may supply a test for activity of the disease and also for differential diagnosis.

Level of urates in the blood of relatives of gouty people was found to be elevated and to be due to an inherited dominant characteristic.

The following new drugs were announced:

Aureomycin, cousin to streptomycin, for Rocky Mountain spotted fever, urinary tract infections, staphylococcus eye infections, Q fever, a virus-caused venereal disease called lymphogranuloma venereum, and virus pneumonia.

Bacillomycin, from a strain of the organism, *Bacillus subtilis*, for fungus infections.

Decapryn, an antiallergic agent, for hay fever, urticaria, angio-neurotic edema and bronchial asthma.

Dibromo procaine, from radioactive bromine, for a local anesthetic.

Dihydroergocornine, from ergot, for high blood pressure.

Khellin, extracted from a Middle Eastern fruit called *Amni visnaga*, for heart disease and bronchial asthma.

Parpanit, belladonna-like drug, for patients with shaking palsy following an attack of the brain disease encephalitis.

Phenosulfazole (tradename Darvisul) for infantile paralysis.

Phenurone, synthetic compound from phenobarbital, for epilepsy.

Phthalylsulfacetimide, a sulfa drug, for cholera, dysentery and other intestinal infections.

Polymyxin, from a bacillus commonly found in soil and water, to check germs causing plague, undulant fever, tularemia, certain types of meningitis and of blood poisoning and wound infections, bacillary dysentery, typhoid and paratyphoid fevers and many types of urinary tract infections.

SKF 538-a, synthesized complex quinine, for killing pain.

6257, sulfa drug, for cholera.

Trimeton, antihistaminic drug, for hay fever, bronchial asthma, allergic skin reactions, hives, and angioneurotic edema.

The Nobel prize in medicine was awarded to Prof. Paul Mueller of Basel, Switzerland, for his discovery of the insecticidal value of DDT.

PSYCHIATRY AND PSYCHOLOGY

Sleep Induced by Gases Relaxed Mental Patients

Mental patients became more relaxed and better able to face their problems after sleep induced by inhaling carbon dioxide mixed with oxygen.

Topectomy, operation cutting away certain areas of the frontal lobes of the brain, was reported to restore to health 20 out of 24 otherwise helplessly sick mental patients.

Ten-minute brain operation, transorbital lobotomy, combined with electro-shock was reported successful in treating some cases of schizophrenia and involutional depressions.

Dibenamine, a sympatholytic drug, was found to ameliorate the clinical condition of patients with marked anxiety states.

Delusions were banished and some mental patients helped to recovery by histamine, chemical believed to play a part in hayfever suffering.

New light was thrown on the fundamental nature of mental ills by studies indicating that patients have a defect which blocks messages from the brain and nervous system to the glandular system.

Operation of the adrenal glands in response to stimulation by the pituitary was found to be impaired in schizophrenics, a discovery which may lead to development of a physiological method of treating this mental disease.

Operation involving the removal of one of the convolutions of the frontal lobes of the brain (gyrectomy), sometimes used for epilepsy, was found to reduce the patient's general intelligence, particularly ability to define words.

Diet deficient in vitamin B complex produced slow and delayed mental abnormality in mental patients; changes due to more drastic reduction of vitamin B intake were more severe but recovery was more rapid than when the deficiency was more moderate.

Mental patients who undergo the brain operation lobotomy were reported to have impaired their ability to solve a maze puzzle.

International Congress on Mental Health projected plans for world wide reduction of mental disturbances which prejudice peace and sanity.

Inspection and rating system was set up to improve conditions in mental hospitals.

Ants were made neurotic by frustration when presented with a problem too difficult for them.

A brain wave was discovered that is apparently really a thought wave because it appears during mental work.

Real leaders of action in a democracy were found to be picked by common consent of their neighbors, not by election votes; they number about one to each 20 of population.

Psychosomatic illnesses such as stomach disorders, skin ailments and some kinds of heart trouble were found prevalent among criminals and traceable to friction in the home.

Sex criminals are more prejudiced against minority groups than are other criminals, study of the hostilities of inmates of a state prison showed.

That the intelligence of human mental defectives may be increased by glutamic acid was confirmed, but intelligence of rats was not improved by feeding them the drug.

Longevity is inherited, also ability to stay in good mental and physical health during old age, study of 2,000 twins over 60 indicated.

Reading ability of military officers was speeded up by special training from an average of 250 words a minute to approximately 600 words a minute, while comprehension remained the same.

Vision is blacked out for three-tenths of a second when a person winks, experiments revealed; most people have vision blacked out completely 11% of the time and at least partly blacked out about 20% of the time.

Man is able to wink some six months before birth, even though the wink serves no immediate practical purpose, studies on the human fetus showed.

Dark adaptation of the eyes of old men was found less than that of young men, but individual differences in loss are great

and independent of obvious structural defects.

Intermittent noise was found less effective than continuous noise as a mask for other sounds.

Noise of escaping steam heard at moderate loudness in one ear was found to make conversation heard with the other ear seem louder and more distinct.

Salt may taste salty, bitter or sweet, depending upon the mobility of its ions rather than upon its composition as a salt, it was observed.

An odor-free double glass house was constructed for testing a person's ability to detect smells, the observers being required to bathe and dress in an odorless envelope before entering.

Time was slowed by suggestion during a hypnotic trance so that within a few seconds incredible tasks were accomplished in the mind.

An automobile driver was put into a hypnotic trance, induced by monotony while at the wheel, indicating that some accidents may be caused by drivers hypnotized

by the monotony of the highway.

A cringing dog, smallest and most submissive of the litter, was made to assert himself by giving him a dose of alcohol.

Behavior while tracing a maze seen only reflected in a mirror was found to reveal emotional instability.

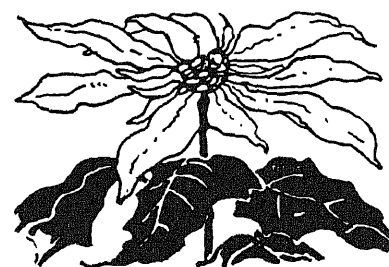
Males were found to be more emotional than females.

Rhythm of the heart beat is affected by emotional disturbances, so that it seems to skip a beat, graphic tracings of the electric current produced by the heart's contraction showed.

Pigeons were taught to be "superstitious," or to repeat meaningless rituals they happened to be engaged in when given food in a hungry state.

Fish were found capable of remembering which way to turn for food even after the food had disappeared from their sight, and of differentiating between the scents of underwater plants and various samples of water.

Science News Letter, December 18, 1948



Poinsettia

GENERAL SCIENCE

Ten Top Science Advances

➤ THE TEN most important science advances made during 1948, as picked by Watson Davis, director of Science Service, are:

1. Creation artificially in world's largest cyclotron of subatomic particles, called mesons, that may unravel mystery of composition of matter.

2. Achievement by jet plane of speeds well beyond the barrier of the speed of sound, opening a new air age.

3. Demonstration that a single penicillin pill, swallowed a few hours after exposure, can prevent one of the two major venereal diseases, gonorrhea.

4. Synthesis of glycerine from petroleum, making its commercial production independent of fat supply.

5. Discovery of aureomycin and poly-

myxin, drugs effective against diseases unconquered by sulfa drugs and other antibiotics.

6. Completion of the 200-inch world's largest telescope on Mt. Palomar, Calif., seeing deepest ever into cosmic space.

7. Authorization of two gigantic atom smashers, to produce three to five years hence sub-atomic "bullets" rivaling cosmic rays of three to seven billion electron-volts, vastly extending scope of nuclear physics.

8. Commercial production of "low-temperature" rubber, giving chemical rubber superiority over natural rubber.

9. Discovery of the fifth moon of the planet Uranus, with 30-hour orbit.

10. Use of neutrons to explore the structure of matter by production of diffraction pattern photographs.

Science News Letter, December 18, 1948

PHYSICS

Zero Isn't Freezing Point

➤ WATER does not freeze at freezing-point but at a considerably lower temperature. Really pure, clean water, free of particles that might serve as nuclei for starting-points of freezing, does not begin to crystallize into ice at zero Centigrade but at zero Fahrenheit or a little below it.

This upset of one of the standard "facts" of all physics books comes as the result of a series of very carefully conducted experiments in the research laboratories of the General Electric Company.

They are reported in SCIENCE (Dec. 10) by Dr. Robert Smith-Johannsen.

Carefully prepared, absolutely clean water was chilled in a specially built apparatus, and the first formation of ice was detected

through the use of polarized light. Four sets of experiments produced first ice at temperatures ranging from 18 to 20 degrees Centigrade below the traditional freezing-point, or from about one-half degree to four degrees below zero on the Fahrenheit scale.

Various powdered substances, ranging from graphite to pepsin, were added to the water as freezing nuclei. Even then nothing was found that would cause water to freeze at the "freezing-point." Most of the powders did raise the freezing temperature of the water, but none got it closer than about seven degrees below zero Centigrade, or approximately 20 degrees above zero Fahrenheit.

Science News Letter, December 18, 1948

➤ CHRISTMAS wreaths and greens are appearing in the shops, and florists are displaying poinsettias. Odd, exotic flowers, from warm lands far removed from the Germanic traditions of our typical Christmas celebrations, nevertheless their bright red flower-heads and shining waxy-green leaves have captivated popular imagination and established themselves as part of the modern Christmas scheme.

To anyone who looks at all carefully at a flower, the poinsettia must be a rather puzzling object. The structure is not at all like that of the flowers we are used to, but looks more like a group of brightly colored leaves on top of a closely-branched twig. As a matter of fact, that is exactly what it is. The red objects that at first look like petals are simply red leaves, very little different, except in color, from the green leaves of the rest of the plant. The real flowers are the tiny, nubby, club-shaped objects clustered at the center. The poinsettia, then, is a whole group of small flowers surrounded by a collar of red leaves.

The poinsettia is not the only member of its family that does this sort of thing. Its tribe, the euphorbias, rather make a specialty of surrounding their inconspicuous flowers with showy leaves. The old-fashioned ornamental called "snow-upon-the-mountain", with its striking white-striped leaves at the top of the plant, is another euphorbia.

There is an old-world euphorbia that is prominent in the Christmas tradition of England. This is the famous Glastonbury thorn, reputed to be the staff of Joseph of Arimathea which he planted on the site of the Glastonbury Abbey, and said to blossom only at Christmastide. This is a thorny euphorbia that is plentiful in Palestine and elsewhere in the Mediterranean region.

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INTRODUCTION TO THE HISTORY OF SCIENCE;
VOLUME III, SCIENCE AND LEARNING IN THE

SOYBEANS IN AMERICAN FARMING—Edwin G. Strand, Department of Agriculture—*Govt. Printing Office*, 66 p., illus., paper, 20 cents. A technical bulletin.

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• Top Patents of The Year •

If you want the patent numbers of the inventions described here send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N Street, N. W., Washington 6, D. C. and ask for Patent Bulletin 1948

Notable and interesting inventions patented during the year include:

Analysis of the atomic makeup of minerals by means of a microanalyzer, built somewhat like an electron microscope except that X-rays are used instead of a stream of electrons.

Improved method for rapidly boring minute holes through tiny diamonds with an electric current fed through the steel needle, the diamond itself completing the circuit.

Increased production of penicillin through treatment of the molds that produce it with X-ray doses powerful enough to create mutated strains that produce larger "crops."

Penicillin in higher concentration and with less tendency to break down before removal from the culture fluid by adding the glucose or corn-steep liquor gradually and including considerable quantities of protein.

Use of weak solutions of 2,4-D to prevent the growth of air-borne bacteria without damaging the mold from which penicillin is harvested.

More efficient extraction from Southern pines of the gum that yields turpentine and rosin by spraying with 2,4-D cuts made through the bark of pine trees.

Food rich in fats, proteins and vitamins from the plant-disease fungus *Fusarium lini*, long notorious as the cause of flax wilt, that can be grown in large quantities on spent sulfite liquor.

Production of the rare-earth element thorium in metallic form 99.5 per cent pure by mixing thorium oxide with metallic calcium and freeing the thorium by converting the calcium into calcium oxide.

Methods of making germanium metal impregnated with helium gas suitable for high-grade rectifiers to convert alternating current into direct current.

Efficient and safe method for producing uranium deuteride by bringing concentrated deuterium or double-weight hydrogen into contact with solid uranium under heat and reduced pressure.

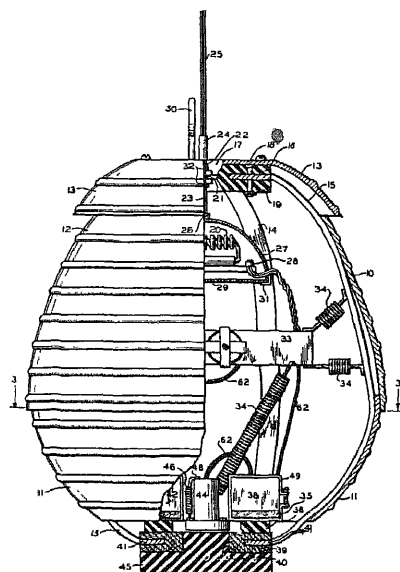
Production of uranium, source of atomic energy, from low-grade domestic carnotite ores by chemically separating from the worthless ingredients the uranium, radium and vanadium in the ore.

Simple, practical and reliable method for giving stainless steels increased resistance to high-temperature stress-rupture by heating up to 2,250 degrees Fahrenheit.

Exhaust nozzle for rockets and rocket motors, with an asphalt composition protective coating to keep the metal from melting in the extreme heat of the discharge gases.

Sweet-potato starch of superior quality obtainable in four hours, as against the 72 required at present, by slicing and grating the roots, adding lime water, and separating the starch in a centrifuge.

Clutch device for motor vehicles which combines the advantages of an electromagnetic clutch and the mechanical centrifugal type.



Robot weather station, on the same general principle as the radiosonde, built to be dropped from aircraft in the midst of polar wastes or on top of unscalable mountains. Picture shown above illustrates this invention.

Starting a fire at the bottom of an oil well to heat the oil-bearing sand and speed up flow in low-yield or nearly exhausted wells.

Replacement for certain uses of optical "flats" with carefully selected pieces of plate glass.

Glass lenses of field glasses, telescopes and range-finders made scratch-proof by depositing on them in a vacuum a thin layer of vaporized quartz.

Corn sheller that can be attached directly to the picker; machine that not only shells the grain but shreds the stalks.

Railway car wheels, without heavy axles, mounted in tandem with a strong supporting frame on both sides that enables trucks to "lead" each other around curves.

Electric motor with rotor of three or more segments of a piezoelectric crystal whose vibrations, in tune with a rapidly oscillating current, can be converted into rotary motion.

Microscope in which the angle of the eyepiece alone can be adjusted while the rest of the instrument remains unchanged.

Movie projector that sweeps the completed picture onto a curved screen as much as a full half-circle in extent by scanning the screen with a several-sided rotating mirror.

Automatic telephone instrument for dialing any number in any city in any state

Science News Letter, December 18, 1948

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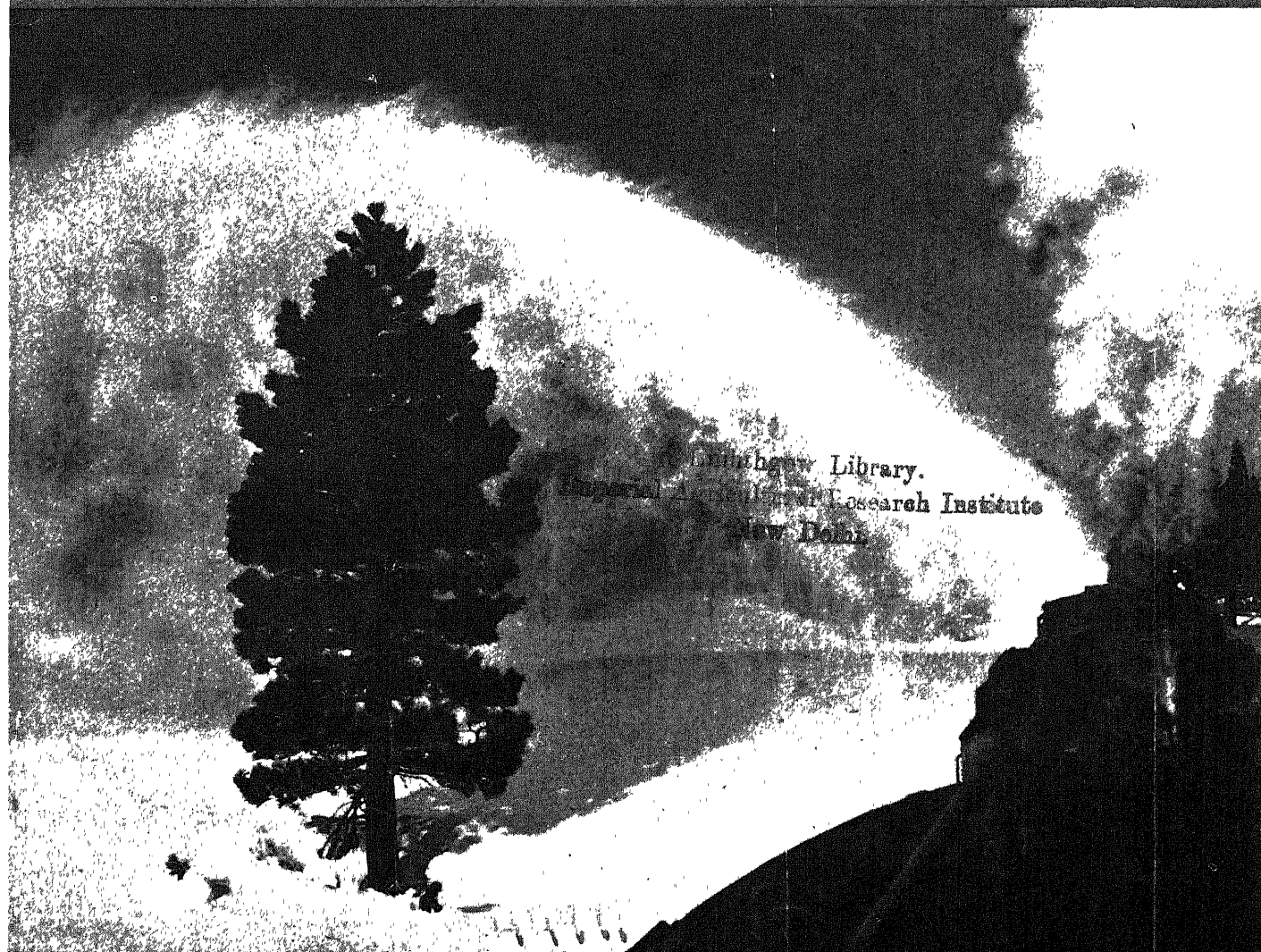
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VOL. 51 NO. 26

GENERAL SCIENCE

New Scientific Vistas

Birthplace of cosmic rays, origin of magnetism, and an early Maya skeleton are among the discoveries announced in the Carnegie Institution report.

➤ A DOZEN major scientific developments were announced in the annual report of the Carnegie Institution of Washington just issued by Dr. Vannevar Bush, president, who was also war-time director of government research.

The birthplace of high-energy particles in the mysterious cosmic rays seems to have been found in the tremendous electric potentials of the variable magnetic fields of "early-type" stars studied by Dr. Horace W. Babcock of Mt. Wilson Observatory.

Occasionally the sun spurts cosmic rays, although most of this earth-bombarding radiation comes from outer space. A research team consisting of Dr. S. E. Forbush and Dr. E. H. Vestine, working with Dr. Manuel Sandoval Vallarta of Mexico, has discovered a "tunnel" can be formed sometimes in the sun's electrical field to let out the billion-volt particles.

The "mother" of chlorophyll, green material that allows the plant to use the sunshine, has been isolated in pure form at the Carnegie Plant Biology laboratories at Stanford, Calif. This protochlorophyll is now being used to study the important process of photosynthesis.

Disturbances in the earth's magnetic field that occur at 27-day intervals have been traced to long-lived bright patches on the revolving sun by Dr. S. B. Nicholson of Mt. Wilson, working with Dr. Oliver Wulf of the U. S. Weather Bureau.

The origin of the earth's magnetism has been narrowed down to two theories: One assumes that the magnetic field is due to a fundamental property of matter and hence associated with the size, mass and rotation of the earth, remaining essentially

unchanged for hundreds of millions of years. According to another theory the field results from a set of complex phenomena inside the earth's central core, based on known electromagnetic laws, which would permit large changes or even reversals of the earth's field during millions of years.

A kind of geologic thermometer was discovered when a mineral, serpentine, was made artificially and shown to be unstable above a temperature of about 900 degrees Fahrenheit.

Flights of B-29 planes at near-record heights of 40,000 to 44,000 feet altitude over thunderheads proved that the electrical field of the earth is kept charged by the 1,800 thunderstorms in progress at any one time on earth.

New kinds of grasses to be used on the grazing ranges of the country are being bred successfully.

A living relative of the redwood, previously known only as a fossil, was discovered and studied in China.

The war gas, nitrogen mustard, was shown to produce changes in the genes, the bearers of heredity of living things, similar to those produced by X-rays.

From a very early Maya tomb in Guatemala the skeleton of a priest or ruler, surrounded by lavish offerings of pottery, carved stone and jade, was unearthed, indicating unexpected technologic progress in the New World at the time that Christ lived in the Old World.

Algae may become a future source of food for the world as a result of experiments that show one kind, *Chlorella*, can produce protein or fat depending upon how it is grown.

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PSYCHOLOGY

Mental Cases Being Aided

➤ VETERANS with such serious mental illness that they seemed doomed to living their lives out in a mental hospital are being restored to health under a new "intensive treatment" program of the Veterans Administration.

A potential discharge rate of almost 40% seems likely on the basis of progress so far.

In a group of 200 World War II veterans at the Northport, Long Island, VA Hospital, 16 have returned home during the past year and 14 others will soon leave for trial visits at home. An additional 45

are considered good prospects for eventual discharge.

Two of the 16 discharged patients are now employed fulltime. VA medical authorities are hopeful regarding the others. They point out that each veteran's release from the hospital puts him in a category in which chances for complete recovery are much greater.

The intensive treatment program is known officially as the Reintegrative Research Program. It was started at Northport last December, under the direction of Dr. William L. Harris, and has since been

adopted by several other VA neuropsychiatric hospitals.

The basic aim of the new program is to increase the interests of the individual patient. Most psychotic patients, who are the ones with the most serious mental illnesses, avoid taking part in group athletics or other forms of occupational therapy and have little or no interest in what goes on around them.

Working in a separate gymnasium and in special treatment rooms, the patients now are on a completely supervised 7 A.M. to 9 P.M. schedule, five days a week. They are housed in a separate ward of the hospital and divided into four groups to facilitate handling.

Starting with such basic forms of athletics as pummeling a punching bag, to relieve some of the aggressive tendencies and tensions displayed by many of these patients, the group is alternated between occupational therapy, corrective therapy, athletics and recreation.

Ping-pong and miniature bowling are suggested to encourage the spirit of competition. Individual and group psychotherapy is available.

Progress is extremely slow, but as individual patients show interest in the activities made available to them, they are advanced to more difficult tasks.

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PUBLIC HEALTH

Three Decades to Add Years to Our Lives

➤ THE AVERAGE length of life in the United States may be extended by almost five years during the next three decades, statisticians of the Metropolitan Life Insurance Company predicted.

By 1960 the average length of life will be 68.4 years and by 1975 it will be 71.4 years. The prediction is based on a "low" mortality forecast which, however, is so conservative that in the past it turned out to be higher than the actual mortality by 2.8%.

For the 20-year-olds in our population, the prospective gain in expectation of life amounts to three and one-half years. At age 40 it is two and three-quarter years and at age 60 almost one year.

By 1975 it is expected that nine-tenths of the new babies born that year will live about 50 years.

"It would not be surprising," the statisticians point out, "if the life table for 1975 should again prove to be too conservative. This does not mean, however, that future gains in longevity will be achieved as readily as those in the past. On the contrary, further gains will require for comparable accomplishment even a higher price in time, effort and funds than we have been accustomed to pay."

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NUCLEAR PHYSICS

Plenty of Uranium

The problem is to find new deposits of this atomic bomb element. Estimates are that it is a thousand times more plentiful than gold.

➤ THERE'S plenty of uranium in the world for the atomic age, chairman David E. Lilienthal of the U. S. Atomic Energy Commission declared.

The big raw material problems being pressed by the Commission, are where it is and how to get it, Mr. Lilienthal said.

Here is where the atomic bomb element, uranium, (believed to form some four ten-thousandths of the earth's crust) is known to be, thus far:

1. High grade deposits of pitchblende-radium. Three of these deposits are known, two outside the Iron Curtain and one inside. Russia is exploiting deposits in the Erzgebirge district of Czechoslovakia and Germany, while the U. S. gets uranium from both Eldorado in Canada and the Shinkolobwe deposits in the Belgian Congo.

2. Colorado plateau ores of vanadium-uranium. Known as carnotite and roscoelite, these ores are chiefly important in this country—and are "quite inferior" to the high grade ores.

3. Gold-uranium ores of South Africa. Discovery of uranium as a by-product of gold mining in South Africa has set American scientists to systematically searching all mine and smelter products in the U. S. for possible by-product uranium.

4. Oil shales which bear uranium may supply millions of tons of uranium ore, Swedish reports indicate. The uranium-bearing oil shale which the Swedes are investigating is known to extend into Russia. In the U. S., the AEC is studying all possible oil shale-uranium deposits.

5. Miscellaneous types of mineral deposits which have been found to contain small amounts of uranium.

Uranium prospecting, Mr. Lilienthal indicated, may be more profitable than the traditional search for gold. The Commission is paying off on discoveries of new deposits. And estimates are that uranium may be a thousand times more plentiful than gold on the earth.

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since the war and Russia has its own great scientists in the nuclear field, among them Kapitzka.

The Drs. Joliot-Curie have been in this country since the war, Dr. Joliot-Curie himself headed the French delegation to the United Nations Atomic Energy discussions. Both of them attended the Princeton bicentennial celebration in 1946.

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BIOCHEMISTRY

Powerful Growth Promoting Substance in Coconut Milk

➤ COCONUT MILK contains a still-unidentified substance that is a sort of "embryo juice" and is exceedingly potent in stimulating growth in certain plant tissues. This discovery was announced by Dr. S. M. Caplin and Prof. F. C. Steward of the University of Rochester in the journal, SCIENCE (Dec. 10).

In their experiments they used tiny pieces of carrot tissue, kept under sterile conditions and supplied with a standard nutrient solution. To some of the cultures they added heat-sterilized, filtered coconut milk; to others the well-known growth-promoting chemical, indole acetic acid;

NUCLEAR PHYSICS

France's Atomic Pile

➤ JUST BECAUSE France has put into operation the world's fourteenth and its first atomic energy "furnace" or chain-reacting pile, under the direction of the avowedly-Communist physicist and Nobelist, Frederic Joliot-Curie, it does not mean that Russia has the atomic bomb.

The French pile near Paris uses uranium, with heavy water instead of graphite as the moderator.

There is a long gap between the atomic pile and the atomic bomb. And a French Communist is not a Moscow communist, although Dr. Joliot-Curie has been quoted as saying that he would give the secret of the atomic bomb to anyone if he knew it.

There are secrets in connection with atomic pile operation. But they are not the same kind of secrets as those involved in the mechanism of the atomic bomb as a military weapon. The secret of the bomb is largely in the "know-how" of putting together two pieces of fissionable material fast enough and safely enough to produce the explosion.

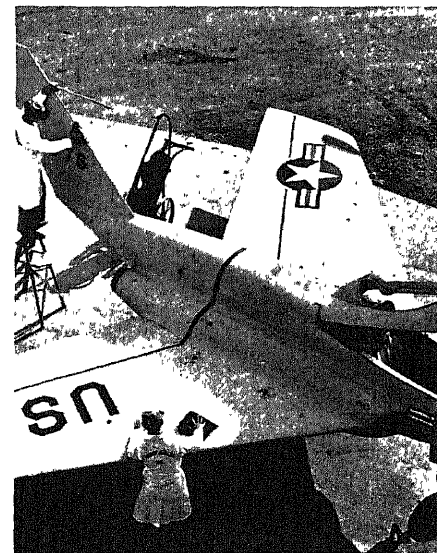
In this country's pioneering it was about two and a half years between the first pile in Chicago (1942) and the first atomic bomb explosion (1945). U. S. bomb production is based upon the production of plutonium, made from non-fissionable uranium,

in three big piles at Hanford, Washington state. The piles elsewhere than at Hanford, including those in Canada, Britain and France, produce little or no usable plutonium so far as known. Atomic bombs are made only in the U. S. A. so far as one can judge.

France might have had an atomic pile much earlier, for at least one French scientist has the ability to make one. Bertram Goldschmidt, French physicist, is credited with having had much to do with the building of the Canadian pile at Chalk River. He was not allowed to continue in the work when military authorities wanted him to become either an American, British or Canadian citizen and he wanted to remain a Frenchman.

Dr. Joliot-Curie, married to the famous daughter of the famous Curies, was the first to produce artificial radioactivity, an achievement he shared with his wife, Irene. That was in 1934. He is admittedly still in the forefront of atomic and nuclear research.

What France can do, Soviet Russia can undoubtedly do. News from Moscow of a Soviet pile would not be surprising, except that the secrecy there is more iron-clad than anywhere else in the world. German scientists are known to be working there



SUBSONIC RESEARCH PLANE—Swept-back wings and a single vertical fin characterize the new USAF's Northrop X-4. It was designed to conduct investigations of speeds just short of sound. The plane is powered by two jet engines and is equipped with an ejection seat for the pilot. The wing span is about 25 feet, length about 20 feet, and weight approximately 7,000 pounds. It completed its first flight test recently at Muroc, Calif., test base.

still other cultures received no additions and served as controls.

The bits of carrot in the control cultures remained alive but failed to grow. Those receiving indole acetic acid showed slow growth, while those receiving coconut milk grew quite rapidly. Their average increase in weight, over a three-week period, was 23 times that of the pieces receiving indole acetic acid.

Although the substance has not yet been identified or isolated, there is some sug-

gestion that it has some relation to the formation or utilization of vitamin A. Further experiments looking into this are now in progress. The two researchers also call attention to a curious analogy in animal life: it has long been known that growth of animal tissue cultures is stimulated by "embryo juice" of animal origin; coconut milk, since it nourishes a plant embryo in the nut, may well be regarded as an "embryo juice" of plant origin.

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MEDICINE

Resistance to Cancer

➤ A NEW principle by which resistance to cancer can be increased has been discovered by Dr. Leonell C. Strong of Yale University.

The discovery so far relates only to resistance of mice against cancer induced by injections of a chemical, methylcholanthrene. But, Dr. Strong says, when the new principle is identified, it perhaps will clear up other phases of the cancer problem, such as prevention and spontaneous regression.

The new principle, he states in his report to the journal, *SCIENCE* (Dec. 17), is probably biochemical in nature. It is transmitted to the next generation through the mother. It is probably not transmitted through the mother's milk, experiments with foster nursing show. It is not a genetic factor. It may also be transmitted from the father but the evidence does not yet show this.

Whatever the new principle is, it influences the rate at which the offspring develop cancer in response to the chemical.

The new principle or agent varies in amount or potency with advancing age. Mice of the first and second litters of parents transmitting the principle develop cancer at a slower rate than their brothers and sisters of the third and fourth litters. The fifth and sixth litters show even less in-

fluence of this cancer-resistant principle.

The resistance, Dr. Strong concludes, is due to the fact that "something is increasing or decreasing in the mother's body that is being handed down to her offspring."

The next step, he points out, is to identify the cancer-resistant agent in mice. Once the substance is identified, the development of a chemical like a vaccine might be achieved.

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BOTANY

African Tree Considered Worth Trying in U. S.

➤ A TREE grows in Morocco that might be well worth a trial in the southwestern United States, states Dr. W. C. Lowdermilk, formerly of the U. S. Soil Conservation Service, just returned from a five-month tour in North Africa as consultant to the French Colonial authorities.

The tree has no common English name; botanists know it as *Argania spinosa*. The "spinosa" part is well merited, for branches and twigs are exceedingly spiny. The leaves, however, are relished by livestock; yet the tree manages to survive even the browsing of the most destructive goats. Requiring little water, it achieves a maximum trunk diameter of 18 inches, and lifts a bushy

crown to a height of 40 feet.

Although it is not related to the olive, its fruits resemble olives in size and shape. The pulp is not appetizing to human taste, but goats and camels like it.

The seeds are the part adapted to human use. They contain a great deal of oil, which the natives of the country press out and use in cooking. They prefer it to olive oil.

A few trees of this species were once planted in California, Dr. Lowdermilk says, but the experiment was not followed through and apparently the trees have perished. He feels that another, more thorough trial might result in the introduction of a valuable addition to our list of dry-land economic plants.

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Photographs: Cover, Western Pine Association; p. 403, U. S. Air Force; p. 405, British Information Services; p. 406, Fremont Davis.

MEDICINE

Amebic Disease Increases

The infection has more than doubled the number of its victims in the first half of 1948. Two new drugs for treating the disease show promise.

➤ AN INCREASE in amebic dysentery and amebiasis in the United States, especially since the end of the war, and two new drugs for treating it were reported at the meeting in New Orleans of the American Society of Tropical Medicine.

More than twice as many cases of amebic infection have been reported during the first six months of 1948 as the 1943-1947 median figure for the corresponding period, Dr. Willard H. Wright, U. S. National Institutes of Health tropical diseases laboratory chief, reported.

Total cases for the first half of 1948 were 1,988. The median figure was 961. The actual number of cases probably is higher than the reported figure.

Reported cases of this disease have gradually increased in past 15 years, since an outbreak in Chicago dramatized the presence in the United States of an infection once considered a tropical disease. Although the increase has been more marked since 1945, Dr. Wright said the return of infected military personnel has apparently had very little influence on the amount of reported amebiasis in this country. If the present rate of increase in reported cases continues, however, this conclusion may be reversed.

The disease is more prevalent in the west south central states, comprising Louisiana, Arkansas, Oklahoma and Texas, than in any other part of the United States. It is more prevalent in the southern states as a whole than any other section, with the possible exception of the Pacific coast states. New England ranks lowest in reported cases, deaths and morbidity rates.

The two drugs for fighting the infection are known so far only by their laboratory names and numbers, WIN 1011 and WIN 246. They were reported by Drs. E. W. Dennis and D. A. Berberian and Miss Sophie S. Hansen of the Sterling-Winthrop Research Institute, Rensselaer, N. Y.

Of 31 patients given WIN 1011, all were promptly cleared of the infection and 28 were permanently cured, Dr. Dennis reported. The other three had recurrences in the 5th, 14th and 20th week, respectively, after treatment. The drug was sufficiently low in toxicity to enable the doctor to give relatively large doses for seven to 10 days.

WIN 246 is an anti-malaria drug, Aralen, with iodine substituted for the chlorine of Aralen to slow its absorption and increase its activity against the amebas. Laboratory animals were effectively freed of their intestinal amebas when given this drug.

Giving two Aralen tablets a week for six weeks to all persons living in areas where malaria is prevalent, in conjunction with DDT spray to control the mosquitoes, provides an economical method of eradicating malaria in endemic areas and

of conquering "a major consequence of the disease in its chronic form," Drs. Berberian and Dennis reported on the basis of tests in two villages in Lebanon.

The "major consequence" they discussed is the enlargement of the spleen which is a serious complication of chronic malaria and causes widespread disability.

In one village where all 215 of the population were given Aralen twice a week, the incidence of enlarged spleens was reduced from 59% to 6% within about 26 weeks. Within the same period the size of the enlarged spleens was reduced on the average from an index of 3 to 0.2.

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MEDICINE

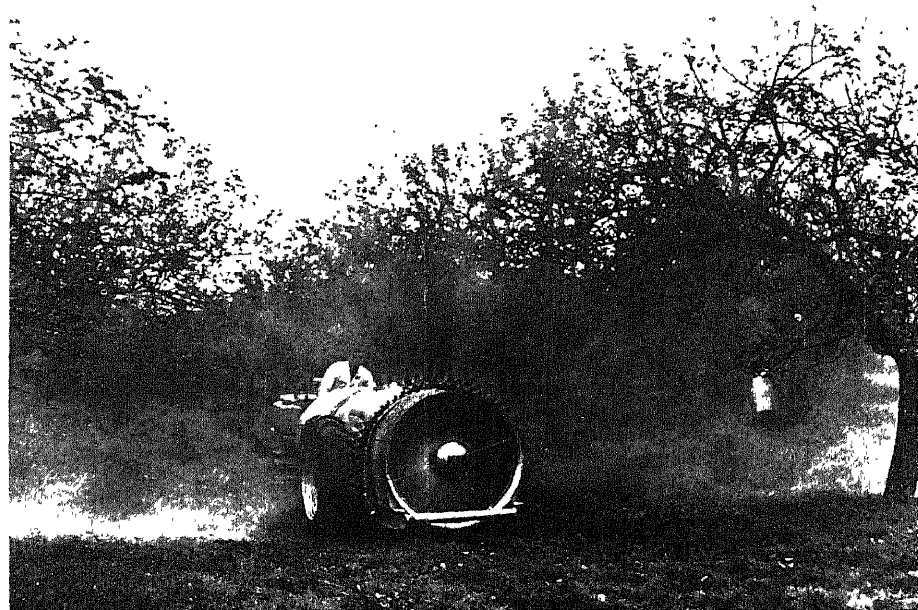
Lung Cancer Detection

➤ LUNG CANCER, which causes 15,000 deaths every year in the United States and is increasing, can be diagnosed in 90% of the cases by sputum test, Drs. Seymour M. Farber, Mortimer A. Benioff and A. K. McGrath of the University of California Medical School reported at the meeting of the Radiological Society of North America in San Francisco.

The test consists of a microscopic examination of stained cells in the sputum.

Cancer cells show characteristic differences from normal cells which can be detected by a trained observer.

Of 671 patients suspected of having lung cancer, 100 eventually proved to have cancer. The sputum test diagnosed the cancer in 71 of these cases. But higher percentage of accurate diagnoses was made in more recent tests in which five or six samples of sputum, instead of only one, were examined. In 69 cases of proved lung



DEATH TO THE PEST—A 100 m.p.h. gale is created with an insecticide by the Autoblaster, a mobile sprayer invented in Britain. The point of ejection is a fast-revolving fan rotating in an enclosed cylinder. Low water pressure atomizes the insecticide which is sprayed over a radius of a complete semi-circle of 40 feet. It is manufactured by the Kent Engineering and Foundry Ltd., Phoenix Works, Tovil, Maidstone, Kent, England.

cancer, in which adequate samples of sputum were available for examination, the test detected the presence of the disease in 63, or 90%.

Increasing experience with the test has helped improve its accuracy, and efficiency will be further increased with more experience. The University is developing techniques for mass application of the test and

training cytologists in the art of differentiating cancer cells.

An early test for the disease is important, the doctors pointed out, because surgeons are now able to remove a cancerous lung and save the patient when the disease is found early.

Science News Letter, December 25, 1948

ASTRONOMY

Carbons in Atmosphere

Small amounts of heavy carbon as well as large quantities of the more familiar type have been detected through use of the sun's spectrum.

► OUR atmosphere many miles above the earth contains small amounts of heavy carbon as well as large quantities of the more familiar type of carbon.

This heavy carbon has been detected by Drs. Leo Goldberg, Orren C. Mohler and Robert R. McMath, University of Michigan astronomers working at the McMath-Hulbert Observatory, Ann Arbor, Mich.

Two different isotopic kinds of carbon dioxide were detected by these astronomers in research on the earth's atmosphere. Each molecule of one of these forms of carbon dioxide is composed of two atoms of oxygen of the usual variety to each atom of heavy-weight carbon. Molecules of the other variety are made up of one atom of carbon to one of the usual variety of oxygen to one of heavy-weight oxygen.

The presence of these forms of carbon dioxide, the gas that you breathe out and that plants need to live, was detected through use of the sun's spectrum.

The special lines indicating their presence are known to originate in the earth's atmosphere rather than in the sun because they appear most strongly when the sun is near the horizon. At sunrise and sunset, light from the sun passes through more of the earth's atmosphere than at other times.

Heavy carbon such as that just detected in the earth's rarefied atmosphere is technically known as carbon 13. Although an atom of carbon normally is 12 times as heavy as an atom of hydrogen, an atom of this rare type weighs 13 times as much as a hydrogen atom.

Carbon 13 has recently been put to work, helping scientists estimate the temperature of seas that existed on earth millions of years ago. Determination of the amount of heavy oxygen in the fossil skeletons of squid-like animals indicates the temperature of the ancient seas in which these animals lived.

While it is not possible at present from the sun's spectrum to estimate the relative abundance of these isotopes, the McMath-Hulbert astronomers reported in the *PHYSICAL REVIEW* (Dec. 15) that they probably are found as often as heavy carbon and heavy oxygen.

About 98.9% of the carbon in the lower atmosphere is of the regular, stable type (C^{12}), and only 1.1% is the heavy variety (C^{13}). It is estimated that 99.7% of the oxygen in the lower atmosphere is of the regular type (O^{16}), and 0.2% is of this heavy, rare kind (O^{18}).

Science News Letter, December 25, 1948

ZOOLOGY

Strange Reptilian Species Flown Here from Australia

► STRANGE, new reptile specimens from Australia have just arrived by air, to be added to the collection at the National Zoological Park in Washington, D. C. Among them are 12 long-necked tortoises,

two tiger snakes and two blacksnakes.

The latter are not related to the harmless native American blacksnakes, explained Director William A. Mann. They are highly poisonous, as are also the tiger snakes.

There are also a lot of lizards: an even dozen each of water dragons, bearded lizards, blue-tongue skinks, brown skinks and Cunningham skinks.

The Zoo has also acquired a young female California condor, to share his cage with the male of the same species already at the zoo.

Science News Letter, December 25, 1948

RADIO

Extend Television Network From East to Mississippi

► TELEVISION receivers in the Great Lakes region and along the Mississippi river will be able to pick up by coaxial cable programs from the Atlantic coast by mid-January, the American Telephone and Telegraph Company revealed. A new coaxial cable installation between Philadelphia and Cleveland will be ready for use by Jan. 11, it states.

This means that television broadcasting in cities from Boston to Richmond will reach television stations in Milwaukee and St. Louis and cities between them and the East. It means that the majority of home television sets in the populous area from the east coast to the Mississippi will be able to get programs originating anywhere in the area.

Science News Letter, December 25, 1948



BEARDED LIZARDS—Part of the strange plane load of reptiles from Australia are these members of the lizard family.

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ASTRONOMY

Two Moon Eclipses in 1949

Orion, the warrior, and Sirius, brightest star seen in the evening skies, will be visible during January. Planet Saturn will appear in the evening.

By JAMES STOKLEY

➤ WITH the coming of January, we look ahead to the new year. While no one can predict human behavior during 1949, we can with great certainty tell of some of the things that will happen in the heavens before another new year is celebrated, and some interesting events are in store for us. There are, for example, two total eclipses of the moon, both of which will be seen from the United States, the first since Dec. 18, 1945. These will come on April 12 and October 6, and full details will be given in these articles as those months approach.

During January evenings, the skies present their typically mid-winter appearance, with Orion, the warrior, riding high in the south, as shown in the accompanying maps. These give the positions of the stars about 10:00 p.m. at the first of the month, and an hour earlier on the 15th. Below and left of Orion is brilliant Sirius, brightest star seen in the evening skies. This is the "dog star," which is part of Canis Major, the great dog. His smaller brother, Canis Minor, is a little higher and farther east, with another brilliant star, Procyon. Still higher, we come to Gemini, the twins, with Castor and Pollux, the latter the brighter.

V-Shaped Group

Above and to the right of Orion is Taurus, the bull. A V-shaped group of stars, called the Hyades, marks the animal's face, and in left-hand arm of the V is the bright reddish star Aldebaran, one of his eyes.

In Orion itself there are two stars of the first magnitude. Betelgeuse is the upper, and Rigel the lower. Between them is the row of three fainter stars, named Alnilam, Alnitak and Mintaka, which form Orion's belt.

Looking toward other parts of the sky we find Deneb, in Cygnus, the swan. Though this is a first magnitude star, it is now so low in the sky that it looks much fainter. The same is true of Regulus, in Leo, the lion, which we see in the east. In this constellation, a little below Regulus, appears Saturn, the only planet now easily visible in the evening.

On Jan. 17 Mercury is farthest east of the sun, and remains in the sky briefly after the sun has set. However, it is then so low that it will be quite difficult to see. Venus, on the other hand, is low in the east just before sunrise, but is exceedingly bright, and not difficult to locate. Mars sets in the west soon after the sun, in the con-

stellation of Capricornus, the sea goat, but it is very faint, of the second magnitude, and not at all conspicuous. Jupiter is directly beyond the sun on Jan. 1, and all month will be so nearly in the same direction that it will not be visible.

As we look forward to the astronomical program which 1949 has in store for us we find four eclipses on the calendar. Two are of the sun, not visible in the United States or Canada. The other two, of the moon, are visible here. Both solar eclipses are partial, and of little scientific interest. The first, on April 28, will see a maximum of about 60 percent of the sun's diameter covered by the moon, the eclipse being visible in Europe, North Africa, Greenland and the North Polar regions.

The second solar eclipse comes on Oct. 21, with 96 percent of the sun's diameter obscured. This, however, is even more inaccessible, as it will be visible from the South Polar regions, the southern part of the Pacific Ocean, New Zealand and all of Australia except the western part.

The first of the total eclipses of the moon for the year comes on the evening of April 12, with the moon completely immersed in the earth's shadow from 10:28 to 11:54, E.S.T. Except for the fact that Alaska will not see the beginning, this will be visible throughout North and South America.

Lunar eclipse number two comes on the evening of Oct. 6, with the moon totally shaded by the earth between 9:30 and 10:33 p.m., E.S.T. This time the beginning will not be seen along the Pacific coast of North America, but otherwise it will be visible in both North and South America.

Not only can the moon eclipse the sun as it passes in front of it, it also can hide stars or planets along its path. Every night some stars are thus eclipsed, or "occulted," but it rarely happens with a planet or a really bright star. In 1949, however, this occurs several times.

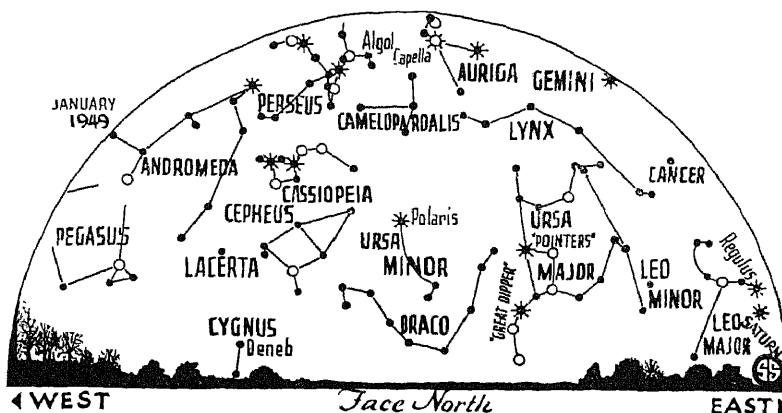
On three occasions there will be occultations of the red star Antares, in the constellation of Scorpius, the scorpion. This group shines brilliantly in the south in summer evenings. The first occultation of Antares is in the early morning hours of April 16, and here again the western part of the United States is deprived of a view. On June 10 Antares is so hidden again, this time late in the evening, but again the western states are left out. They score on Aug. 30, with the third, which is not seen at all in the east. Unfortunately, this happens in the afternoon hours, so it will only be visible with the aid of a telescope. Also, people in the western states will only see the star emerge from behind the moon, as the beginning of the occultation occurs below the horizon.

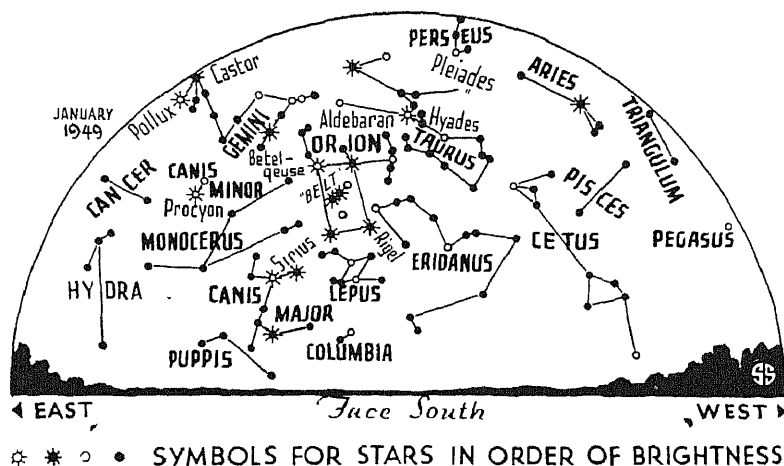
Occultation of Venus

An occultation of the planet Venus is listed for Aug. 26. This will be visible only in the eastern part of the country, and again the beginning will be below the horizon. Venus is so bright, however, that the end should be seen easily with binoculars, and perhaps even with the unaided eye.

Tracing the course of the planets during 1949, we find that Mercury will be to the east of the sun, and potentially visible in the evening, on Jan. 17, May 10 and Sept. 7. It will appear in the morning sky before sunrise about Feb. 27, June 28 and Oct. 19.

At the start of the year, Venus is a morning star, shining in the east before sunrise, but on April 16 it will pass behind the sun and will be invisible for a month or so around this date. By early summer it will begin to be conspicuous in the





western evening sky. On Nov. 20 it will be farthest east of the sun, and will set about three hours after that body. On Dec. 26, 1949, when it will be in the constellation of Ophiuchus, it will be at its greatest brilliance, with magnitude of minus 4.4, which is about 15 times as bright as the star Sirius.

Mars, as for many months past, will be inconspicuous during the first part of 1949. On St. Patrick's day it will be on the far side of the sun, at a distance of 221,770,000 miles. Then it will swing to the western side of the sun, and will begin to be visible in the east in the early morning sky. Approaching nearer the earth, it will reach first magnitude by the end of October. On Dec. 19, 1949, it will be a quarter of the way around the sky to the west of the sun, when it will rise about midnight. At that time it will be only 124,790,000 miles away. (In March, 1950, it will be opposite the sun, rising at midnight, and 60,427,000 miles away, its closest approach on this trip.)

Jupiter, in the same direction as the sun Jan. 1, will be opposite that body on July 20, so it will be prominent in the summer evening skies. Saturn, now visible, will be opposite the sun Feb. 21, and will be conspicuous during the spring and early summer.

Time Table for January

Jan.	EST	
3	9:00 a. m.	Earth nearest sun, 91,469,000 miles
5	3:00 a. m.	Moon farthest, 251,200 miles
7	6:51 a. m.	Moon at first quarter
11	1:55 a. m.	Algol (variable star in Perseus) at minimum
14	4:59 p. m.	Full moon
	10:44 p. m.	Algol at minimum
16	10:00 p. m.	Moon nearest, 225,600 miles
17	9:54 a. m.	Moon passes Saturn
	7:33 p. m.	Algol at minimum
20	4:22 p. m.	Algol at minimum
21	9:07 a. m.	Moon in last quarter
24	3:00 a. m.	Venus passes Jupiter
28	9:42 p. m.	New moon

Subtract one hour for CT, two hours for MT, and three hours for PT.

Science News Letter, December 25, 1948

ERRATA, Vol. 54, Nos. 1-26, July-December, 1948

PAGE	TITLE BEGINS	CORRECTION
6	Poison Gas	Line 1, delete poisonous; line 10, well-known for poisonous.
13	Soap Operas	See Letters to Editor, p. 100
100	Boring into Wood	See Letters to Editor, p. 180
124	Puzzle Over Metasequoia	See Letters to Editor, p. 132
126	Virus Molecules	Line 17, one month for four ten-thousandths.
154	Guardian of Antiquity	Sub title: Fourteen for eight; Col. 1, par. 6, line 10, 14 for eight.
163	Seedless Watermelons	Col. 3, par. 7-8, sex cell for cell; 7 for two sets of; promotes for retards; number for sets; 14 for four sets of; doubled for nearly sexless four; melon whose sex cell is for three-chromosome melon.
224	Nature Ramblings	Col. 3, line 1, desiccation for dessication.
238	Germ-Carrying Mosquitoes	Line 2, read Wake and Guam islands; line 6, Wake for the; line 13, after found insert on Guam, that for the; line 19, On Guam for Along.
240	Nature Ramblings	Col. 3, line 12, latitude for longitude.
260	Sticky-Leaved Weed	Change Dr. to Mr.; lines 9-10, delete in the hills.
262	Meteor from Outer Space	Col. 3, line 1, kinetic energy for force.
295	Spectrographic Methods	Line 7, Optical Society of America for American Chemical Society.
326	New Camera May Help Save	Line 2, Cancer for ulcer.

ENGINEERING

Titanium Metal May Replace Many Now in Use

➤ IT IS as strong as steel, as rust-proof as platinum, a little heavier than aluminum and resistant and strong at fiery temperatures. Pure titanium metal has all these features, and more besides, engineers from industrial and government laboratories were told at a Symposium on Titanium held by the Office of Naval Research in Washington.

Titanium metal has been called the "Cinderella of Metals," because after a long neglect it has recently been discovered to have a combination of the best features of aluminum alloys and stainless steels.

Its strength makes it suitable for guns, and its light weight would more easily allow an airborne army to fly to battle with complete arms and other metal equipment. Titanium is so completely resistant against salt water and salt air that it can be compared only with platinum in this respect.

Entire seaplanes might be built of the strong but light metal.

Titanium's corrosion resistance is maintained against the violent acids. Aqua regia, which dissolves gold, does not damage titanium, even when hot. Industrial chemical processes, plagued with corrosion, can use titanium for pipes, tanks and fittings.

The high melting temperature of the metal classes it with tungsten as a "refractory" metal. Titanium holds its strength at high temperatures, promising use in aircraft engines and jet turbines.

Ores of titanium are widely distributed, and it is the fourth most plentiful mineral on the earth. Yet the value of titanium has been little appreciated because of the difficulty in producing it in pure form. Cheap production of titanium is a major goal of present work described at the symposium.

The current price of \$5 per pound is not surprising in view of the present small-lot production of a few pounds at a time. The big difficulty is getting the metal pure enough. When titanium was first isolated in 1825 by Berzelius, small amounts of oxygen from the air made his sample brittle. Methods of excluding the air are now used, but there is still difficulty in finding a crucible in which to melt the metal, as most lining materials that have been tried were dissolved.

Titanium investigation is wide open for research and inventions, the symposium emphasized. Almost everything that is known about titanium looks good, and scientists promised the meeting that there are more exciting developments yet to come from this "rediscovered" metal.

Science News Letter, December 25, 1948

Plants vary widely in ability to sprout and to grow in salty soils.

PSYCHIATRY

Multiple Sclerosis Aid

➤ PSYCHIATRIC treatment can help multiple sclerosis patients in two ways, Dr. O. R. Langworthy of Baltimore told the Association for Research in Nervous and Mental Disease at its meeting in New York.

1. It can boost the patient's morale. This is important because multiple sclerosis is a progressive, crippling disease which strikes at an early age but allows its victims to live a long time.

2. More intensive psychiatric treatment might arrest the progress of the disease if, as Dr. Langworthy suspects, emotional turmoil operates on the blood vessels of the brain in such a way as to cause the organic nerve changes of multiple sclerosis. While this is only theory, Dr. Langworthy thinks intensive psychiatric treatment should be tried on an experimental basis.

Dr. Langworthy bases his theory on the fact that patients he has studied have had emotional difficulties of an hysterical type long before the organic symptoms of multiple sclerosis set in.

Multiple sclerosis is "in some sense an allergic disease," Dr. Tracy J. Putnam, of Beverly Hills, Calif., declared.

But attempts to change the patient's allergic tendencies with vaccines, histamine, benadryl, pyribenzamine and other anti-allergic drugs have been disappointing.

Dicoumarin, anti-clotting chemical, seems to reduce the tendency to acute relapses but has no effect on established symptoms.

A permanent change to a better climate, Dr. Putnam said, seems often to be effective in arresting the course of the disease. It is commoner and more severe, he pointed out, in cold wet climates than in warm dry ones.

"Startling" differences from the normal were revealed in personality tests of multiple sclerosis patients. These were reported by Dr. Molly R. Harrower of New York. She said the deviations are "so startling" as to "call for serious attention."

The startling differences showed up in their lack of answers reflecting anxiety and concern over bodily functions, their willingness to be dependent, their almost exaggerated submission and compliance, and their over-cordiality to other persons.

Science News Letter, December 25, 1948

ASTRONOMY

More Work on Giant Eye

➤ THE 200-inch mirror of the Hale telescope at Palomar Observatory, Calif., will probably have to be removed from the telescope and some of the glass polished away before this "gigantic eye" begins to probe the universe.

When final tests of the mirror were made in the optical shop at the California Institute of Technology over a year ago, the outer edge of the glass disk, almost 17 feet across, was found to be about 20 millionths of an inch too high. It was estimated, however, that when the mirror was placed in a horizontal position in the telescope, the edge would sag about this amount, explains Dr. Ira S. Bowen, Observatory director.

Under actual operating conditions, however, the mirror did not sag at the edge as much as expected. The edges still tended to "turn up" a bit. This was corrected to some extent by modifying the support system, but not enough.

It was also found that the mirror did not adjust uniformly to temperature changes. The edge was turned up by different amounts, depending upon the temperature to which the mirror had been exposed during the preceding 24 hours.

Several remedies will be tried to overcome these difficulties. A system of small fans will be installed inside the cell which holds the mirror. The outside edge will

be insulated, though previous attempts of this type with other telescope mirrors have not proved too satisfactory.

But if these changes, or a combination of them, do not enable the telescope to catch light that started on its way to the earth a billion years ago, some of the glass will have to be removed from the mirror's outer edge. This area, 18 inches wide, represents about 30% of the total mirror surface.

If such polishing is required, it will be done at the observatory. Actually not more than a few millionths of an inch must be ground away. But a minimum of six months would be required for the job, as the mirror must be tested in the telescope frequently to avoid any possibility of removing too much glass.

Science News Letter, December 25, 1948

AERONAUTICS

Aviation Trophy Honors Supersonic Achievement

➤ AVIATION'S highest honor, the Collier Trophy, was presented by President Truman to three men most responsible for the attainment, on Oct. 14, 1947, of human supersonic flight. The award was presented on the 45th anniversary of the day that the

Wright Brothers conquered the air.

The men to receive this high honor, of which the National Aeronautic Association is custodian, are John Stack, research scientist of the National Advisory Committee for Aeronautics; Lawrence D. Bell, president of the Buffalo company which bears his name and builder of the plane that beat the speed of sound; and Capt. Charles E. Yeager, U. S. Air Force, pilot of the plane in its first supersonic flight.

Presentation of the trophy, established 37 years ago by Robert J. Collier, the first editor of Collier's Weekly, for flight at supersonic speeds only 45 years after the first powered, man-carrying airplane flight in history, points emphatically to the nation's aeronautical progress. The first problem in this particular undertaking was to determine the physical laws which would affect supersonic flight. John Stack was a leader in the necessary studies. His work on the fundamental problem was made at NACA's Langley Field, Hampton, Va., with its wind tunnels and in its laboratories.

The airplane that traveled much faster than the 760 miles an hour, the speed of sound at sea level, is the U. S. Air Force XS-1, an experimental, rocket-powered, instrument-carrying, research plane built by the Bell Aircraft Corp., in the design of which NACA, Air Force and Bell engineers all played a part. Mr. Bell's personal contribution in the design was important because he has been building many types of experimental and other planes for over 35 years.

Before the plane was pushed to supersonic speed, it was tested at lower speeds over and over again by Capt. Yeager. First tests were as a glider. Later it traveled on its own power. In all flights, it was taken high into the atmosphere by an Air Force bomber and released when proper altitude was gained. These tests gave the pilot accumulated scientific knowledge of what was ahead in transonic and supersonic flights, and readied him for the flight that broke the sound barrier.

Science News Letter, December 25, 1948

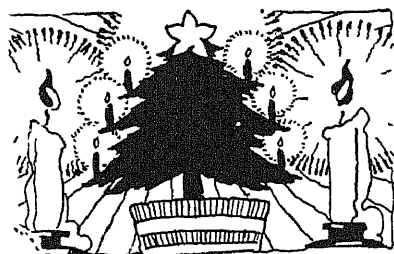
On This Week's Cover

This pine tree has been spared the lumberman's axe and stands in solitary beauty as a locomotive-powered, rotary snowplow on the right throws snow out in an arc silhouetting it in the foreground.

Science News Letter, December 25, 1948

A helping of *potato* has about as much iron as two slices of enriched bread or about as much as half an egg; one medium-sized boiled potato has as much vitamin C as a small glass of tomato juice.

High fuel consumption at low speeds is today one of the greatest barriers to the introduction of jet-propelled airliners on scheduled routes.



Trees Bearing Gifts

➤ CHRISTMAS TREES bear strange, bright, sweet fruits, quite alien to their normal burden of dry, sober-hued cones. Children, accustomed to miracles, unquestioningly devour the brightness with wide eager eyes, the sweetness with omnivorous and bottomless stomachs. Only to grown-ups, who have already all but shut the gates of the Kingdom against themselves,

does there seem anything out of place about a conifer tree holding forth on its hundred green fingers gifts of gilded walnuts or ruby-hued lollipops.

Yet we may be on the threshold of even stranger wonders than these, through the workings of those modern magi, the chemists. Instead of offering a few goodies hung on their branches, small trees may be giving us the branches themselves in the guise of meat and milk and sugar for our meal—and even a synthetic liqueur to top it off withal.

It isn't a question of mere possibility any more. It has been known for a long time that wood can be changed into sugar by a quite simple treatment with dilute acid. There probably isn't a high-school chemistry student in the land who hasn't done it. Feeding the sugar to yeasts, along with a few necessary mineral salts, is equally simple; the process can be directed either to the production of alcohol or to the growth of great masses of yeast, as desired. The yeast in turn can be used for feeding livestock, to produce meat and

milk. It may soon be possible to process the yeast directly into a palatable high-protein human food.

All this has been accomplished already, not merely in laboratory test-tubes and flasks, but in fairly large-scale pilot-plant vats and stills. The chemistry problem has been successfully finished; remaining for consideration are questions of engineering and economics. If these can be solved with equal success, the coming generation may see, not single trees bearing gifts at Christmas, but whole hosts of them becoming gifts themselves every day in the year.

This does not need to mean a further devastation of our already sadly depleted forest lands. For this chemical-biological conversion of wood into food even poor and ill-favored trees, now despised and rejected, will serve perfectly well. Millions of acres of pine-barrens and scrub-oak wasteland, at present not rated as even low-grade pasture, may on some not too remote tomorrow be putting red steaks, white milk and golden butter into our Christmas kitchens.

Science News Letter, December 25, 1948

FORESTRY

Low-Grade Timber Uses

➤ TREES like aspen and beech, scornfully passed up as not worth cutting in the lush days of American lumbering, are now coming into their own, it was demonstrated at the meeting of the Society of American Foresters in Boston. Several speakers told how these Cinderella tree species are beginning to be better appreciated, now that wood and wood products are becoming scarcer and costlier.

In the region around the Great Lakes, two-fifths of the land under timber is now covered with aspen, stated Hereford Garland, of the Michigan College of Mining and Technology, and Z. A. Zasada of the Lakes States Forest Experiment Station. Hitherto it has been the policy simply to let aspen stands alone, for their water-conservation and other protective functions, but not to expect much of the species in the way of direct economic returns. However, with the growing wood hunger all over the country, a change of policy seems indicated.

A little of the timbers, about six percent, can be sawed into lumber, a survey showed; 18 percent is in the pole timber class; the rest is classified as seedlings and saplings of varying degrees of promise. A large use in paper-pulp is possible, especially if sizes considered unsuitable for high-grade pulp are permitted to be used in the production of building paper.

Beech is another species hitherto considered secondary that is now being looked at somewhat more favorably, reported David B. Cook of the New York State Conservation Department and Ivan H. Sims of

the Northeastern Forest Experiment Station. Flooring is its principal lumber use; other uses are mostly for pieces that can be handled in short lengths, because of beechwood's troublesome tendency to warp in seasoning. The two foresters expressed the belief, however, that research will develop more effective seasoning methods, which will improve the lumber to the point where old-time prejudices against it will be overcome.

Low-grade hardwoods in the South are also coming in for more consideration. Such trees as ash, hackberry, elm and the gums, ignored when Southern lumbermen were intent only on highgrade pine, are finding scores of uses, all the way from pulpwood to small lumber. These uses were reviewed before the meeting by Paul N. Garrison, chief forester of the Gaylord Container Corporation of Bogalusa, La.

Low-grade softwoods as well as the once-despised hardwoods have begun to demonstrate their possible value in the Pacific Northwest, stated George L. Drake of the Simpson Logging Company, Shelton, Wash. In addition, removal of bark from big logs before sawing leaves slab and trimmings, once merely tossed under the boiler, ready to be chipped into material for the pulpwood digester.

Science News Letter, December 25, 1948

An experimental type of *radio receiver*, known as a single-sideband receiver, uses an electronic principle which doubles the number of broadcasts usually accommodated by a given radio band.

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ANNOTATED BIBLIOGRAPHY ON ATOMIC ENERGY: 257 Selected References for Schools and Discussion Groups—Israel Light—*Teachers College*, 29 p., paper, 35 cents.

BLOOD'S MAGIC FOR ALL—Alton L. Blakeslee—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. Giving a good idea what you are contributing to public health and safety when you give a pint of your blood to the National Blood Program of the Red Cross.

CARNEGIE CORPORATION OF NEW YORK, REPORT OF THE PRESIDENT—*Carnegie Corporation of New York*, 32 p., paper, free upon request direct to publisher, 522 Fifth Ave., New York 18.

A CATALOGUE OF INSECTICIDES AND FUNGICIDES, VOLUME II: CHEMICAL FUNGICIDES AND PLANT INSECTICIDES—Donald E. H. Frear—*Chronica Botanica*, 153 p., illus., \$5.50. Arranged according to a coding system.

CHEMISTRY AND USES OF INSECTICIDES—E. R. de Ong—*Reinhold*, 345 p., illus., \$6.00. A book of information for the general reader, a reference book for the professional worker and a text for the college student.

CORNELL CONFERENCES ON THERAPY, VOLUME THREE—Harry Gold and others, Eds.—*Macmillan*, 337 p., \$3.50. One of a series of volumes being issued annually to present the conferences held at Cornell University Medical College and the New York Hospital.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING, CASE STUDIES 3: THE DEWEY AND ALMY CHEMICAL COMPANY, THE INTERNATIONAL CHEMICAL WORKERS UNION—Douglas McGregor and Joseph N. Scanlon—*National Planning Association*, 85 p., paper, \$1.00.

CENTER FIRE METRIC PISTOL AND REVOLVER CARTRIDGES, Volume I of Cartridge Identification—Henry P. White and Burton D. Munhall—*Infantry Journal*, 97 p., illus., \$7.50. Useful reference book for police officers and others concerned with ballistical data.

CRUSADE IN EUROPE—Dwight D. Eisenhower—*Doubleday*, 559 p., illus., \$5.00. This was a crusade for intellectual and scientific freedom as well as the more physical liberty to live and move about without the restraints of barbed wire and Gestapo. A gripping, personal account.

INVESTIGATIONS OF HUMAN REQUIREMENTS FOR B-COMPLEX VITAMINS—Max K. Horwitt, Erich Liebert, Oscar Kreisler and Phyllis Wittman—*National Research Council*, 106 p., paper, \$1.00.

MICROWAVES AND RADAR ELECTRONICS—Ernest C. Pollard and Julian M. Sturtevant—*Wiley*, 426 p., illus., \$5.00. A text for advanced undergraduate or graduate courses in physics or engineering based on experience at the Radiation Laboratory of MIT.

THE NATIONAL ACADEMY OF SCIENCES AND THE NATIONAL RESEARCH COUNCIL—Raymond L. Zwemer—*National Research Council*, 5 p., illus., paper, free upon request direct to publisher. Historical and other information about these important scientific societies.

PROPAGATION OF SOUND IN THE OCEAN—J. Lamar Worzel and others—*Geological Society*

of America, 34 p., illus., \$2.75 Including "Explosion Sounds in Shallow Water," "Theory of Propagation of Explosive Sound in Shallow Water," and "Long-Range Sound Transmission."

PHOTOGRAPHIC 1949: The Annual of America's Leading Photographers—American Society of Magazine Photographers—*McGraw-Hill*, 210 p., illus., \$6.95. A lovely annual about half of the photographs in which were never published, some rejected, but the photographers themselves believe you'll like them. A book for amateurs and picture lovers as well as professionals.

RECOMMENDED DIETARY ALLOWANCES—Food and Nutrition Board—*National Research Council*, 31 p., paper, 25 cents.

THE ROAD TO REASON—Lecomte du Nouy and translated and edited by Mary Lecomte du Nouy—*Longmans*, 254 p., illus., \$3.50. A philosophical work.

ROCKET DEVELOPMENT: Liquid-Fuel Rocket Research 1929-1941—Robert H. Goddard, edited by Esther C. Goddard and G. Edward Pendray—*Prentice-Hall*, 291 p., illus., \$6.50. Here is the history of the pioneer work in this important field.

SCIENCE OUTPOST: Papers of the Sino-British Science Co-Operation Office (British Council Scientific Office in China) 1942-1946—Joseph Needham and Dorothy Needham Eds.—*Pilot Press*, 313 p., illus., \$4.25. Letters, journals and even poems are included in this account of British cooperation in Chinese scientific work under the most difficult conditions of Western China.

YOUNG PEOPLE'S BOOK OF JET PROPULSION—Frank Ross, Jr.—*McBride*, 128 p., illus., \$2.75. Numerous photographs add to the interest of this book for boys.

YOUR BABY: The Complete Baby Book for Mothers and Fathers—Gladys Denny Shultz and Lee Forrest Hill—*Doubleday*, 278 p., illus., \$3.50. Generously illustrated with excellent photographs showing Dad as well as Mother how to care for the baby and small child.

Science News Letter, December 25, 1948

PUBLIC HEALTH

Death Rate Jump Noted For 1947 in New Figures

➤ THE death rate for the nation increased last year (1947), latest figures from the U. S. National Office of Vital Statistics show.

The 1947 figure was 1007.8 deaths per 100,000 estimated total midyear population, excluding armed forces overseas. The 1946 rate was 997.6 per 100,000. Deaths among the armed forces overseas and stillbirths are not included in these rates.

Almost a third, 31.9%, of deaths throughout the nation were due to diseases of the heart, which is the leading cause of death. Heart disease deaths increased during the year (1947) by 31,350 over the number of

heart deaths the preceding year.

Deaths from cancer, apoplexy, and diabetes also increased.

Bright side of the picture is that there were fewer deaths from nephritis (kidney disease) and that the major infectious diseases set new record lows in deaths.

Science News Letter, December 25, 1948

MEDICINE

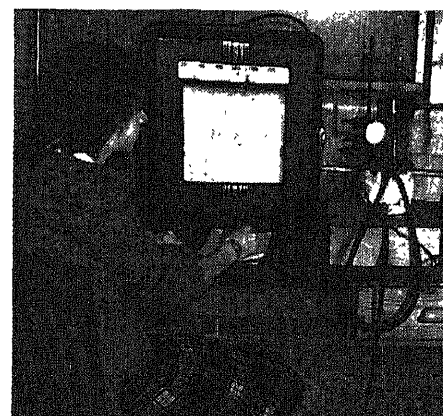
Miniature Attacks May Be Yardstick for Big Disease

➤ A LITTLE of a disease may help solve the problem of a big disease, multiple sclerosis. It would do this by serving as a yardstick to test new drugs. This suggestion was made by Dr. Richard M. Brickner of New York at the meeting of the Association for Research in Nervous and Mental Disease.

Multiple sclerosis is a progressive paralytic disease. It strikes without warning, usually between the ages of 20 and 40. No cause or effective treatment has yet been discovered.

The miniature attacks Dr. Brickner suggests using for yardsticks of drugs are often brought on by exposure to light or heat or by eating or smoking.

Science News Letter, December 25, 1948



COUNTING MILLIVOLTS TO PROTECT PEOPLE

Set-up at Vernay Laboratories for testing thermostats which will be used to safeguard the comfort and safety of air travellers. Thermostat plunger when tested must develop correct pressure (shown by gauge) at predetermined temperature which is verified by thermocouple and Speedomax Recorder.

Further information on request.



J.R. Ad N-33A-420 (1c)

• New Machines and Gadgets •

If you want more information on the new things described here, send a three cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 445. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

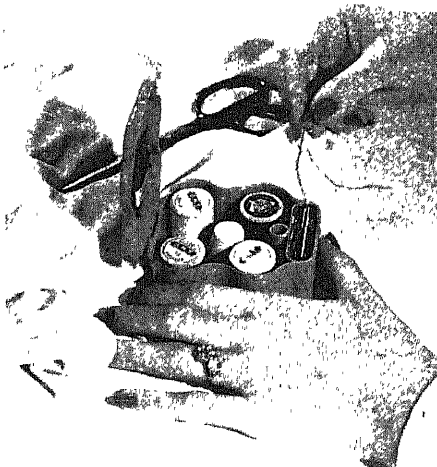
⚙️ **VACUUM CLEANER** picks up dirt through a hose and discharges it down the sink drain, eliminating the job of emptying a dust bag. It has two four-foot sections of special hose attached to the suction unit, each stretchable to 20 feet. One end of the hose is attached to a disposal unit placed over the drain pipe, the disposal unit being attached to a water faucet.

Science News Letter, December 25, 1948

⚙️ **SKATE SHARPENER**, for the amateur, is a plastic block that can be easily held in the hand with slots on opposite sides for two types of blades. These slots contain a high-grade sharpening agent which quickly does the job when the block is rubbed back and forth on the blade.

Science News Letter, December 25, 1948

⚙️ **AUTOMATIC NEEDLE** threader, included in the sewing kit shown in the picture, is simple to operate and threading is accomplished without eye strain. The thread from one of the spools in the decorative plastic case is slipped under clamps



on a tiny sliding shuttle; whizzing the needle back and forth threads it.

Science News Letter, December 25, 1948

⚙️ **INEXPENSIVE blackboard**, for school or home use, has a paper or cardboard backing colored black with ink or dye, and then given a plastic waterproof coating. This recently patented school essential has a roughened surface that takes chalk; it can be easily cleaned with eraser or damp rug.

Science News Letter, December 25, 1948

⚙️ **NURSING BOTTLE**, a collapsible, disposable type for one use only, eliminates the task of washing and sterilizing bottles. Made of a soft, pliable, strong plastic that collapses as the food is drawn out. It ends fighting back-pressure, collapsed nipples and air-swallowing.

Science News Letter, December 25, 1948

⚙️ **WOVEN PLASTIC-FIBER innersoles** for shoes are designed to provide ventilation for the feet. They are easily washed with soap and water, are non-absorbent and moisture-proof and, in addition, are durable and hold their shapes.

Science News Letter, December 25, 1948

Do You Know?

Milling wastes in rice mills can be used to provide a high-grade salad or cooking oil, laboratory experiments show.

Underground electric cables with rubber insulation are often greatly damaged by bacteria in the soil; lead-covered cable is safe from this danger.

Coffee-producing countries are tropical or semi-tropical; coffee-drinking countries, with the highest per capita rate of consumption, occupy the rugged areas of the North Temperate zone.

Serviceability of wood in construction depends upon one or more strength properties; each species of wood may excel in some particular property and in particular uses, but not in all properties and uses.

Cleveland, Ohio, long known as one of the top ports of the Great Lakes, had more than 60 foreign ships visit its harbor during the present year, in the seven to eight months that the harbor is not ice-locked.

The first steel-making blast furnace constructed in America was near the Jamestown colony in Virginia, blown-in in 1622; it never produced because its smoke-belching caused an Indian massacre.

Science News Letter, December 25, 1948

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